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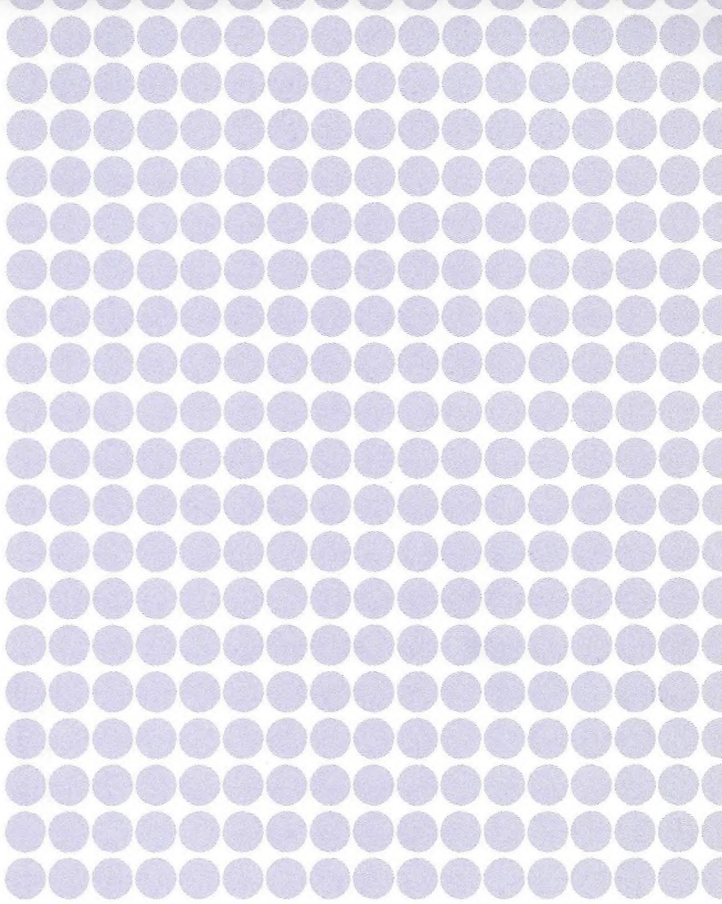

SIGGRAPH2004

the 31st International Conference on Computer Graphics and Interactive Techniques

Program & Buyer's Guide

conference
8-12 AUGUST 2004
exhibition
10-12 AUGUST 2004

Los Angeles Convention Center

LOS ANGELES, CALIFORNIA USA

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SIGGRAPH 2004
Conference Registration Categories

- ● **Full Conference**
- ◉ **Conference Select**
- ○ **Exhibits Plus**

Conference at a Glance

		7 Saturday	8 Sunday	9 Monday	10 Tuesday	11 Wednesday	12 Thursday
	Registration	6 - 8 pm	8 am - 6:30 pm	8 am - 6:30 pm	8 am - 6:30 pm	8 am - 6:30 pm	8 am - 3 pm
	Merchandise Pickup Center	6 - 8 pm	8 am - 6:30 pm	8 am - 6:30 pm	8 am - 6:30 pm	8 am - 6:30 pm	8 am - 6 pm
	SIGGRAPH Store	6 - 8 pm	8 am - 6:30 pm	8 am - 6:30 pm	8 am - 6:30 pm	8 am - 6:30 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			10:30 am - 5:30 pm	10:30 am - 5:30 pm	1:45 - 3:30 pm	1:45 - 3:30 pm
●◉	Sketches		8:30 am - 5:30 pm	8:30 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	8:30 am - 5:30 pm	8:30 am - 5:30 pm	8:30 am - 5:30 pm	8:30 am - noon
●◉	Web Graphics					8:30 am - 5:30 pm	8:30 am - 5:30 pm
●◉	Educators Program					8:30 am - 5 pm	8:30 am - 5:30 pm
●◉○	Keynote Address/Awards			1:15 - 3:15 pm			
	Special Sessions						
●◉	Real-Time 3DX: Demo or Die			6 - 8 pm			
●◉	Computer Music				1:45 - 3:15 pm		
●◉	Puppetry and Computer Graphics				6 - 8 pm		
●◉	VJ: The Art of Live Video Performance					6 - 8 pm	
●◉	Next-Generation Game Visuals						10:30 am - 12:15 pm
	Special Events						
●◉○	Fast-Forward Papers Preview		6 - 8 pm				
●◉○	CyberFashion Show					6:30 - 7:30 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 Theater		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	noon - 4 pm	
●◉○	Pathfinders	6 - 8 pm	8 am - 6 pm	8 am - 6 pm	8 am - 6 pm	8 am - 6 pm	8 am - 5 pm

Welcome to SIGGRAPH 2004

The Program & Buyer's Guide is your manual for the vast array of events at SIGGRAPH 2004, including screenings of the year's best computer animations, inspiring art, posters and presentations on the latest research, and courses on the tools and techniques you need to succeed in computer graphics and interactive techniques.

If you are new to the SIGGRAPH conference and need some tips on how to manage your time at the conference, stop by the Pathfinders Booth in the South Lobby. If you are a frequent attendee, you have probably already picked out the don't miss sessions from everything you've explored at previous conferences. But I challenge you to also check out some of the conference activities you have never attended. There is a rich community of ideas available at SIGGRAPH 2004, and important connections can be made in the most unexpected places.

One session you definitely shouldn't miss is the Keynote Address:

Bruce Sterling
When Blobjects Rule the Earth
Monday, 9 August, 1:15-3:15 pm
West Hall B

Just before he speaks, you'll hear my enthusiastic thank you to the more than 1,000 volunteers who gave their time this year to make the conference possible. From reviewers to program chairs to subcommittee members, their contribution of effort and expertise is what makes this conference great. If you are interested in being a part of it next year, please join me at:

Get Involved
Wednesday, 11 August, 5:00-6:30 pm
Compass Café

The annual conference is also the place where we recognize and celebrate excellence in its many forms. This year, I would like to extend special congratulations to our award winners:

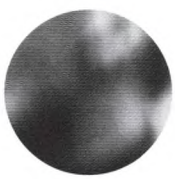
Computer Graphics Achievement Award
Hugues Hoppe, Microsoft Research

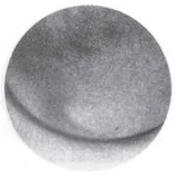
Significant New Researcher Award
Zoran Popović, University of Washington

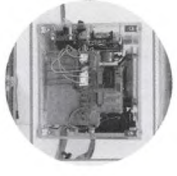
Outstanding Service Award
Judith R. Brown, The University of Iowa (Retired); and Steve Cunningham, California State University, Stanislaus and National Science Foundation

Welcome to Los Angeles and our annual celebration of the best in computer graphics and interactive techniques. Enjoy!

Dena Slothower
SIGGRAPH 2004 Conference Chair







Conference Overview

Molecular interiors, galactic visions, tomorrow's visual effects.

Responsive machines, extra-human intelligence, alternative realities.

Code, concepts, mathematics, theories, applications.

World-class experts teach all this and more. Creative adventurers show 2004's most advanced achievements in computer graphics and interactive techniques. And you acquire the inside data you need to succeed in this amazing industry.

SIGGRAPH 2004
Conference Registration Categories

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- ◉ **Conference Select**
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One Day registration includes access to conference programs and events. Does not include technical documentation or tickets for the reception and Electronic Theater.

●◉○
Keynote Address and Awards
Monday, 9 August, 1:15 - 3:15 pm
West Hall B

Bruce Sterling
When Blobjects Rule the Earth

Bruce Sterling, science fiction writer, speculates on what happens when graphic simulation conquers the world.

A picture is worth a thousand words. A model is worth a thousand pictures. What happens when there's no longer any practical difference between computer-generated models and physical, manufactured objects? Desktop fabrication is a lab curiosity - so far - but what happens to societies, markets, industries, and professions when you can push "print" and spit out a bicycle?

Immediately before the keynote address, ACM SIGGRAPH presents the Computer Graphics Achievement Award to Hugues Hoppe, Microsoft Research; the Significant New Researcher Award to Zoran Popović, University of Washington; and the Outstanding Service Award to Judith R. Brown, The University of Iowa (Retired); and Steve Cunningham, California State University, Stanislaus and National Science Foundation.

Presentations

●
Courses
Sunday - Wednesday, 8 - 11 August
West Hall A and B, Petree Hall C and D, Room 515A, 515B, 502A, 502B, 511AB, 501AB

Practical skills, deep understanding, and clear explanations presented by the leading experts in computer graphics and interactive techniques. Tutorials, half-day sessions, and full-day courses teach beginning, intermediate, and advanced topics in digital art and science, including interaction design, perception, computing hardware, display systems, wireless applications, gaming, animation, and modeling.

Full Conference registration allows attendees access to all SIGGRAPH 2004 Courses. All the Course Notes are on the Full Conference DVD-ROM that Full Conference attendees receive with their registration. For a complete list of Courses, see pages 12-45.

●
Papers
Monday - Thursday, 9 - 12 August
West Hall A, West Hall B, Petree Hall C

The premier international forum for groundbreaking, provocative, and important new work in computer graphics and interactive techniques. SIGGRAPH 2004 papers set the standard in the field, stimulate future trends, and explore challenging issues in related fields: human-computer interaction, computer-aided design, computer vision, robotics, visualization, web graphics, and computer games, among others. For a list of Papers, see pages 46-53.

●
Panels
Monday - Thursday, 9 - 12 August
Petree Hall C, Room 501AB, Room 502A, Room 511AB

Debate, argument, and discussion on important topics in computer graphics and interactive techniques, and related fields. Experts and skeptics deliver opinions, insights, speculation, and summaries of recent work. The audience follows up with questions, comments, and criticism. The result: new perspectives on key questions and current controversies. Complete list of Panels: pages 54-57.

●●
Sketches
Sunday - Thursday, 8 - 12 August
West Hall A and B, Petree Hall C and D, Room 515A, 515B, 502A, 502B, 511AB, 501AB

Short talks followed by question-and-answer exchanges on a broad spectrum of topics in art, design, science, and engineering. Sketches emphasize novel and interdisciplinary applications of computer graphics and interactive techniques, including provocative speculation, academic research, industrial development, practical tools, and behind-the-scenes explanations of commercial and artistic works. For a list of speakers and topics, see pages 58-78.

●●
Educators Program
Wednesday - Thursday, 11 - 12 August
Room 502B and 511AB

Content: how to teach computer graphics and develop academic resources. Continuity: computer graphics in education, from pre-school to post-graduate study. Collaboration: between art and science, educators and researchers, teachers and students, the classroom and the real world. Panels, forums, papers, and Quick Takes explore all this and more in the not-just-for-Educators Program. For a list of Educators Program sessions, see pages 92-100.

●●○
Posters
Sunday - Wednesday, 8 - 11 August
West Hall A

New for SIGGRAPH 2004. Poster displays of research in computer graphics and interactive techniques, including newly developing projects, smaller works, incremental or partial results, and late-breaking research. For a list of Poster sessions, see pages 79-86.

●●
Web Graphics
Sunday - Thursday, 8 - 12 August
Room 501AB

Presentations and demonstrations of the year's most innovative online work. Artists, designers, producers, and programmers from around the world share their achievements in rich internet applications, web 3D, navigation, visualization, usability, motion graphics, web art, web content for handheld devices, and many more areas. For a list of Web Graphics sessions, see pages 87-91.

●●○
Exhibitor Tech Talks
Tuesday - Thursday, 10 - 12 August
Hall G

Late-breaking updates on the year's most important advances in 3D animation, games, shading, visualization, processors, APIs, career development, and more. In Exhibitor Tech Talks, SIGGRAPH 2004 exhibitors present two-hour tutorials and interactive instruction on their products and services. For a list of Exhibitor Tech Talks see pages 9-10.

●●○
SIGGRAPH Conference Contributor Recognition Forum
Tuesday, 10 August, 1 - 1:45 pm
Room 502A

As part of its ongoing effort to improve the annual SIGGRAPH conference, ACM SIGGRAPH is proposing changes in the recognition provided to presenters and volunteers. The proposed changes are presented and discussed in this forum. All contributors and attendees are invited to attend.

Hot topics explored by world-class experts in fun events that demonstrate the creative energy of the international SIGGRAPH community.

Special Events

●○○

Fast-Forward Papers Preview

Sunday, 8 August, 6 - 8 pm
West Hall A

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.

●○○

How Content is Selected

Monday, 9 August, 3:45 - 5:30 pm
Room 511AB

Representatives from SIGGRAPH conference programs answer questions about the process by which content is selected for the annual SIGGRAPH conference.

Session Chair
Patricia Beckman-Wells
SIGGRAPH 2005 Educators Program Chair

Panelists
Ronen Barzel
SIGGRAPH 2004 Sketches and Posters Chair

Samuel Lord Black
SIGGRAPH 2005 Computer Animation Festival Chair

Chris Bregler
SIGGRAPH 2004 Computer Animation Festival Chair

Heather Elliott-Famularo
SIGGRAPH 2004 Emerging Technologies Chair

Sue Gollifer
SIGGRAPH 2004 Art Gallery Chair

Tony Longson
SIGGRAPH 2004 Educators Program Chair

Joe Marks
SIGGRAPH 2004 Papers Chair

Jamie L. Mohler
SIGGRAPH 2005 Conference Chair

Joe Munkeby
Flenser

●○○

ACM Student Research Competition Presentation

Wednesday, 11 August, 3:45 - 5:30 pm
Room 515B

Winners of the ACM Student Rescarch Competition at SIGGRAPH 2004 present brief summaries of the work they are displaying in the Posters exhibit.

Special Sessions

●○

Real-Time 3DX: Demo or Die

Monday, 9 August, 6 - 8 pm
West Hall A

This demonstration highlights real-time graphics of all types in a fast-paced, fun, and inspiring way. If you want to see the best real-time computer graphics work from industry, universities, and "secret" labs, this is the event for you. Participants have approximately two minutes to show off their best stuff in one of four categories:

- Business, Educational, Artistic, Scientific, Training
- Games, Entertainment
- 3D Multiuser Environments
- Emerging Technologies

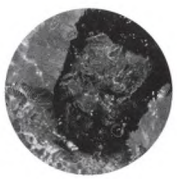
All demos are non-commercial, and the host drags participants off the stage if they indulge in hype. Bring an enthusiastic attitude to the event and be prepared for serious fun. The audience votes for category and best-of-show winners, in real time, using an innovative laser-pointer voting system developed at Iowa State University. Bring your laser pointers!

Organizers
Sandy Ressler
National Institute of Standards Technology
sressler@nist.gov

Leonard Daly
Daly Realism
daly@realism.com

Assisting
Ronald Sidharta
Iowa State University

Jayme Hero
Iowa State University



●○

Computer Music

Tuesday, 10 August, 1:45 - 3:15 pm
Petree Hall C

The field of computer music, which has evolved from its origins in early computing technology, analog electronic music, digital signal processing, audio engineering, and the experimental music tradition, represents the nexus of modern creative and technical issues associated with digital audio and analysis. This Special Session features experts at the forefront of several primary research areas:

- Software-based sound synthesis
- Human-computer interface technologies for performers and composers
- Acoustic simulation of auditory environments
- Sound spatialization and presentation of electro-acoustic music
- Intuitive computer music composition
- Computer-assisted music composition and affective music computing systems
- Stylistic emulation and modeling of human performers
- Music information retrieval

Each panel member addresses ongoing research in these primary points of focus within the broader context of their historical impetus and potential future applications.

Organizer
Perry R.Cook
Princeton University
prc@cs.princeton.edu

Panelists
Curtis Roads
University of California, Santa Barbara

Joe Paradiso
MIT Media Lab

Conference Registration Categories

● **Full Conference** ◉ **Conference Select** ○ **Exhibits Plus**

One Day registration includes access to conference programs and events.
Does not include technical documentation or tickets for the reception and Electronic Theater.

●◉

Puppetry and Computer Graphics

Tuesday, 10 August, 6 - 8 pm
West Hall A

Pioneering artists such as Jim Henson and Phil Tippett, and many other puppeteers, have been experimenting with computer graphics from the beginning.

Jim Henson's early CG puppets, Waldo C. Graphic and Tizzy the Bee, led to development of the Henson Digital Performance Studio, and, more recently, CG versions of Kermit the Frog and Gonzo the Great. Tippet's Digital Input Device first gave CG animation access to additional stop-motion animators working on "Jurassic Park" and "Starship Troopers." Virtual CG sets of "The Jim Henson Hour" and "The Wubbulous World of Dr. Seuss" also added a broader freedom to the medium.

This special session reviews the history, advantages, and future of CG in puppetry, and it presents many personal stories from the puppeteers' perspective.

Organizer
Terrence Masson
Iron Lore Entertainment, Ltd.

Moderator
William Sherman
NCSA/University of Illinois at Urbana-Champaign
wsherman@uiuc.edu

Panelists
David Barclay
PerformFX

Craig Hayes
Tippet Studios

Trey Stokes
Truly Dangerous Company

David Goelz
Bret Nelson
Jim Henson Company

●◉

VJ: The Art of Live Video Performance

Wednesday, 11 August, 6 - 8 pm
West Hall A

The explosive new generation of visual artists known as VJs and the dozens of companies that support them with new tools, equipment, and software are continually creating more complex and vivid presentations. In this roundtable discussion hosted by Los Angeles Video Artists (LAVA), several respected and widely known VJs offer insight into current and future trends for this adventurous new culture.

Organizer
James Cui, VJ Fader
Los Angeles Video Artists
vjfader@yahoo.com

Panelists
Vello Virkhaus, VJ v2
V Squared Labs Inc.

Radley Marx
Eoptica/VJTV

Ryan Tandy
connected system

Ben Sheppee
DAVY FORCE

Nathan Whitford
Urban Visuals

●◉

Next-Generation Game Visuals

Thursday, 12 August, 10:30 am - 12:15 pm
West Hall B

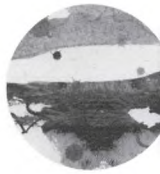
The next generation of game hardware and real-time, per-pixel shading will make it possible to create more compelling interactive visuals then ever before. Dramatic improvements are on the horizon in high-resolution models and textures, soft subtle lighting, complex character animation, and amazing visual effects. Presenters from top game companies, including Habib Zargarpur ("Need to Speed Underground" and "007 Bond: Everything or Nothing") and Henry LaBounta ("SSX3") from Electronic Arts, show examples of what they are doing now to push the envelope and speak about their plans for creating the breathtaking games of tomorrow.

Organizer
Henry LaBounta
Electronic Arts Canada
henryl@ea.com

Panelists
Viktor Antonov
Valve Software

Nishii Ikuo
Robot Communications, Inc.

Habib Zargarpour
Electronic Arts Canada



Experiences

●●○
Art Gallery: Synaesthesia
Sunday - Thursday, 8 - 12 August
Concourse Foyer, Room 153A

Original digital art that emerges from the conjunction of cybernetics and human vision to help us re-experience, re-examine, and make sense of our bodies, our technologies, and our culture. Synaesthesia features visionary work in every field of digital art: 2D, 3D, interactive techniques, installations, virtual reality, multimedia, telecommunications, web art, and animation.

Computer Animation Festival

●●○
Animation Theater
Sunday - Thursday, 8 - 12 August
Room 409AB and 411

●●
Electronic Theater
Monday - Wednesday, 9 - 11 August
Hall K

The world's most innovative, imaginative works in computer graphics and interactive techniques: animation, visualization, simulation, visual effects, and technical imagery produced by adventurers who blend art and science into unique visual experiences. The Computer Animation Festival jury presents selected works in the Electronic Theater (matinée and evening shows) and the Animation Theater (throughout the week).

●●○
Emerging Technologies
Sunday - Thursday, 8 - 12 August
Rooms 150-152

Interactive displays of assumption-shattering concepts that will enhance human life in the near and distant future. Installations of both technology and art created by scientists, engineers, and fine artists. What's next in augmented and virtual reality, ubiquitous computing, displays, hand-held devices, real-time graphics, mobile technologies, robotics, imaging technology, haptics, sensors, gaming, the web, wearable systems, visualization, collaborative environments, entertainment, and art.

●●○
Guerilla Studio
Sunday - Thursday, 8 - 12 August
Room 408AB

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 provides an educational component where artists in residence instruct attendees on technique and explore the possibilities of digital art.

●
Reception
Wednesday, 11 August, 8 - 10 pm
Pershing Square, Olive & Sixth Streets

SIGGRAPH 2004 has reserved exclusive use of Pershing Square for the conference reception on Wednesday, 11 August. Attendees gather under the stars, surrounded by historic LA architecture, dramatic downtown office towers, and friends and colleagues from six continents. Food, drink, music, and entertainment will be scattered throughout the square for refreshment and diversion.

●●○
3DTV Launch
Wednesday, 11 August, 10 pm
Pershing Square, Olive & Sixth Street

3DTV presents an all-star entertainment event immediately following the SIGGRAPH 2004 reception, in Pershing Square, featuring performances by several of the world's top VJs, a surprise appearance by one of rock's hottest acts, and 3DTV's revolutionary iRiff guitar motion-capture technology.

●●○
ACM SIGGRAPH Chapters Party
Monday, 9 August, 8:30 pm - 2 am
The Mayan, 1048 South Hill Street

Services

●●○
Birds of a Feather

Attendee-organized sessions on shared interests, goals, technologies, environments, or backgrounds. For a listing, see page 133.
At SIGGRAPH 2004, impromptu gatherings can be organized through the Birds of a Feather schedule board in the West Lobby.

●●○
Get Involved
Wednesday, 11 August, 5 - 6:30 pm
Compass Café

Inside information on how you can contribute your expertise and energy to SIGGRAPH 2005 and SIGGRAPH 2006. All attendees, exhibitors, and presenters are invited. All questions and comments are welcome.

●●○
International Resources
Saturday - Thursday, 7 - 12 August
South Lobby

In the International Center, the multi-lingual International Resources Committee answers attendee questions, offers space for talks and demonstrations, and provides informal translation services.

●●○
Job Fair
Tuesday - Wednesday, 10 - 11 August
Room 403

Leading companies in computer graphics discuss employment opportunities with SIGGRAPH 2004 attendees in a relaxed, informal setting. Sponsored by:

The Art Institutes℠
America's Leader in Creative Education

●●○
Pathfinders
Saturday - Thursday, 7 - 12 August
South Lobby

Personal guidance to the full range of possibilities at SIGGRAPH 2004. If you need information, consultation, or expert recommendations, talk with a veteran SIGGRAPH mentor at Pathfinders.

Exhibitor Tech Talks

Late-breaking updates on the year's most important advances in 3D animation, games, shading, visualization, processors, APIs, career development, and more. In Exhibitor Tech Talks, SIGGRAPH 2004 exhibitors present two-hour tutorials and interactive instruction on their products and services.

Quick and Dirty 3D Sketching with SketchUp

@Last Software, Inc./Sketchup
Tuesday, 10 August, 10 am - noon
Hall G, Room 1

This important new sketching software is working its way into design offices of all kinds. Learn the basics of SketchUp, how you can benefit from using it, and how to integrate it into your work.

John Bacus
@Last Software, Inc./Sketchup
821 Pearl Street
Boulder, Colorado 80302 USA
Jbacus@sketchup.com

Reshaping the Digital Pipe: AMD64 Technology in High-End Visualization

AMD
Tuesday, 10 August, 10 am - noon
Hall G, Room 2

AMD64 Technology is revolutionizing today's digital media production process across the industry. In this session, learn how AMD64 technology is being utilized in major studios and development houses to reshape everything from pre-visualization to post-production, game development, and film distribution. Learn how AMD64 technology has helped change the landscape of digital media creation and what it can do for you.

Dan Houdek
AMD
5204 East Ben White Boulevard
Austin, Texas 78741 USA
Dan.houdek@amd.com

The Power of Pixel Shaders: Using High-Level Shading Languages in Professional Applications

ATI Technologies Inc.
Tuesday, 10 August, 1 - 3 pm
Hall G, Room 1

Programmable pixel shaders are all the rage for today's computer games. But how can they be leveraged in today's workstation software applications? Learn how high-level shading languages are used to create a new generation of professional content creation and CAD applications.

Dinesh Sharma
ATI Technologies
4555 Great America Parkway
Santa Clara, California 95054 USA
dsharma@ati.com

Training for Careers in Animation and Technology

Vancouver Film School
Wednesday, 11 August, 10 am - noon
Hall G, Room 1

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

Larry Bafia
Vancouver Film School
200 198 West Hastings Street
Vancouver, British Columbia V6B 1H2 Canada
larry@vfs.com

PCI Express* Technology: A Breakthrough Technology for the Graphics Industry

Intel Corporation
Wednesday, 11 August, 10 am - noon
Hall G, Room 2

PCI Express technology, a new I/O interconnect technology replacing PCI and AGP in 2004 systems, promises to offer a plethora of performance advancements for the graphics community. In this session, Intel experts discuss the performance attributes of PCI Express-enabled workstations and rendering-farm applications, and give insight into the availability of PCI Express graphics capability.

Allyson Klein
Intel Corporation
2111 NE 25th Avenue
Hillsboro, Oregon 97124 USA
allyson.klein@intel.com

Exhibitor Sessions

The Making of "Ruby: The DoubleCross"

ATI Technologies, Inc.
Wednesday, 11 August, 1 - 3 pm
Hall G, Room 1

This talk describes the making of the real-time 3D animation "Ruby: The DoubleCross," which is showing in the Computer Animation Festival. Topics include the process of creating this stunning animation from the initial concept to the finished real-time demo and the content-creation and graphics-engine sides of the demo, including detailed discussion of the shading techniques using Direct3D HLSL shaders.

Callan McInally
ATI Research, Inc.
62 Forest Street
Marborough, Maine 01752 USA
callan@ati.com

COLLADA: An Open Interchange File Format for the Interactive 3D Industry

Sony Computer Entertainment
Wednesday, 11 August, 1 - 3 pm
Hall G, Room 2

Alias, Discreet, and Sony Computer Entertainment introduce COLLADA, to dramatically improve today's content pipeline with an open and extensible, collaboratively designed interchange file format that enables existing and future tools to scale up to the exciting challenges of the next wave of interactive content development.

Remi Arnaud
Graphics Architect
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Middle-Earth: Imagination Made More Real

New Zealand Trade and Enterprise
Wednesday, 11 August, 4 - 6 pm
Hall G, Room 1

A showcase of New Zealand's creative technology companies specializing in cutting-edge animation, simulation, 3D modeling, and augmented reality.

Jeremy Gimbel
New Zealand Trade and Enterprise
12400 Wilshire Boulevard, Suite 1120
Los Angeles, California 90025 USA
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Kaydara User Group

Annie Bélanger
Kaydara Inc.
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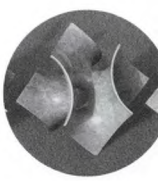
Faster, Smarter, and More Flexible: A Sneak Preview of MOTIONBUILDER 6

Tuesday, 10 August, 4 - 6 pm
Room 406AB

Presentations and demonstrations of Kaydara's most innovative and groundbreaking 3D character animation technology. An in-depth look at the latest version of its renowned application, MOTIONBUILDER 6. This session also features presentations by special guests.

Exciting new features in MOTIONBUILDER 6 include enhanced IK and FK keyframe capabilities; interchangeable character setups with added support for props, constraints, and custom properties; tools for managing motion curves dynamics; and a simplified and customizable user interface. Heralded as one of the best real-time 3D character animation solutions on the market, MOTIONBUILDER 6 allows users to create animated content quickly and easily for games, films, web, and broadcast.

Kaydara demonstrates MOTIONBUILDER 6 in Booth 1300.



NVIDIA Corporation

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

HLSL Shader Workshop: Introductory

Monday, 9 August, 10:30 am and 3:45 pm
Tuesday, 10 August, 1:45 pm
Wednesday, 11 August, 10:30 am and 3:45 pm
Thursday, 12 August, 1:45 pm
Room 402A

Try your hand at writing shaders and other real-time effects! This hands-on workshop introduces real-time shader programming with the Microsoft DirectX 9.0 High-Level Shader Language (HLSL). Attendees learn how to harness the power of the latest GPU technology through a language as familiar as C while using a powerful shader IDE. Developers learn how to integrate shaders with their applications and create new effects that are only possible with HLSL. All machines used for the labs are the latest AMD64-based computers with NVIDIA GeForce 6800 GPUs. The workshop also includes tips for writing efficient shaders and strategies for debugging them. The workshop is intended for experienced graphics programmers familiar with fundamental 3D graphics techniques, including simple matrix math.

HLSL Shader Workshop: Advanced

Monday, 9 August, 1:45 pm
Tuesday, 10 August, 10:30 am and 3:45 pm
Wednesday, 11 August, 1:45 pm
Thursday, 12 August, 10:30 am and 3:45 pm
Room 402A

In this hands-on session, attendees develop a variety of next-generation advanced shader effects using the Microsoft DirectX 9.0 High-Level Shader Language (HLSL). The focus is on practical, high-quality techniques that can easily be integrated with attendees' ongoing and future projects to help set them apart from the pack. Topics include High Dynamic Range (HDR) and Pre-Computed Radiance Transfer (PRT) lighting techniques as well as implementation specifics such as floating-point filtering, and floating-point blending. All machines used for the labs are the latest AMD64-based computers with NVIDIA GeForce 6800 GPUs. The workshop also includes strategies for writing performant shaders, as well as an overview of potential applications in graphics and general-purpose scenarios. The advanced session is for experienced coders who are already conversant with writing shaders and want to take their knowledge to a higher level.

Shader Model 3.0 Unleashed

Tuesday, 10 August, 1:45 - 3:15 pm
Wednesday, 11 August, 3:45 - 5:30 pm
Thursday, 12 August, 10:30 am - 12:15 pm
Room 401

The latest GPUs, like the NVIDIA Quadro FX 4000 and others from the GeForce 6 Series, support significant new features, such as reading textures in vertex programs, advanced flow control in fragment programs, floating-point filtering, floating-point blending, and geometry instancing. This talk dissects practical examples of Shader Model 3.0 in action to enrich visual complexity and improve performance.

Transforming Production Workflows With the GPU

Monday, 9 August, 3:45 - 5:30 pm
Wednesday, 11 August, 10:30 am - 12:15 pm
Thursday, 12 August, 1:45 - 3:15 pm
Room 401

The rapid pace of GPU performance advances comes in parallel with the increasing convergence among films, games, and surrounding media. Games are being recast as films, films create matching games, and the technology of imaging is increasingly shared among all facets of the storytelling media. This talk covers high-performance, practical, real-time applications of shading technology for expressive and realistic shading to complete and complement the best of movie effects. Examples are primarily via the NVIDIA FX Composer shader authoring tool, with application for games and DCC users, whether they're programmers or artists.

GPU Performance Tools and Analysis Techniques

Monday, 9 August, 1:45 - 3:15 pm
Tuesday, 10 August, 10:30 am - 12:15 pm
Thursday, 12 August, 3:45 - 5:30 pm
Room 401

The complexity of modern GPUs requires the use of a sophisticated toolset when creating, debugging, and tuning your real-time applications. Leveraging our intimate knowledge of the GPU and driver, NVIDIA has created a suite of performance analysis and optimization tools that identify performance bottlenecks and report critical performance metrics. This talk showcases the toolset for performance optimization while tackling bottlenecks in an actual application, through a step-by-step case study using NVPerfHUD, FX Composer, and other tools.

Image Processing With the GPU

Monday, 9 August, 10:30 am - 12:15 pm
Tuesday, 10 August, 3:45 - 5:30 pm
Wednesday, 11 August, 1:45 - 3:15 pm
Room 401

Programmable GPUs supporting 32-bit floating-point calculation are extremely well-suited for many image-processing tasks. this talk examines various methods for harnessing the power of the GPU for pixel processing. Attendees learn about pixel buffer objects, multiple-draw buffers, floating-point filtering and blending, getting data quickly to and from the GPU, and high-dynamic-range (HDR) and GPU-based paint applications.

www.siggraph.org/s2004

Locations

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

Courses

Practical skills, deep understanding, and clear explanations presented by the leading experts in computer graphics and interactive techniques. Tutorials, half-day sessions, and full-day courses teach beginning, intermediate, and advanced topics in digital art and science, including interaction design, perception, computing hardware, display systems, wireless applications, gaming, animation, and modeling.

Courses Committee

Jacquelyn Martino
SIGGRAPH 2004 Courses Chair
Massachusetts Institute of Technology

John Fujii
SIGGRAPH 2005 Courses Chair
Hewlett-Packard

Steve Hwan
Walt Disney Feature Animation

Nan Schaller
Rochester Institute of Technology

Peter Schroeder
California Institute of Technology

Dave Shreiner
SGI

Katie Rylander
Program Coordinator

Course Evaluation

All course attendees are encouraged to evaluate SIGGRAPH 2004 Courses content and presenters. Online evaluation forms are available at:

www.siggraph.org/courses_evaluation

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

Sunday, 8 August

1

Real-Time Shading

Sunday, Full-Day, 8:30 am - 5:30 pm **West Hall B**

Level: Advanced

Real-time procedural shading was once a distant dream. When the first version of this course was offered four years ago, real-time shading was possible, but only with one-of-a-kind hardware or by combining the effects of tens to hundreds of rendering passes. Today, almost every new computer comes with graphics hardware capable of interactively executing shaders of thousands to tens of thousands of instructions.

For SIGGRAPH 2004, the course has been redesigned to address today's real-time shading capabilities and provide more practical information for practitioners. The morning sessions cover the more advanced technical aspects of creating a shading system. Afternoon sessions cover practical details of real-time shading use, including an overview of recently developed algorithms that run well on today's shading hardware, followed by presentations on the latest hardware developments from several leading hardware vendors. The course concludes with a question-and-answer session, where attendees can ask questions of any presenter or suggest topics of discussion.

Prerequisites

Working knowledge of a modern real-time graphics API like OpenGL or Direct3D. Familiarity with the concepts of procedural shading and shading languages.

Intended Audience

Technical practitioners and software developers who use or intend to use real-time shading.

Organizer

Marc Olano
University of Maryland, Baltimore County
olano@umbc.edu

Lecturers

Kurt Akeley
NVIDIA Corporation

John C. Hart
University of Illinois at Urbana-Champaign

Wolfgang Heidrich
The University of British Columbia

Michael McCool
University of Waterloo

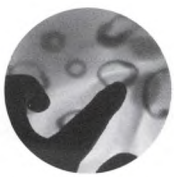
Jason L. Mitchell
ATI Research

Marc Olano
University of Maryland, Baltimore County

Randi Rost
3Dlabs, Inc.

Schedule

	Part 1: Shading Technology
8:30	• Introduction • Ignoring Hardware Differences • Shading Compilers **Olano**
9:35	3D Graphics Hardware Architectures **Akeley**
10:15	Break
	Part 2: Shading Language
10:30	Overview **McCool**
10:50	OpenGL Shading Language **Rost**
11:10	HLSL **Mitchell**
11:30	Shader Metaprogramming With Sh **McCool**
11:50	Sampling Procedural Shaders **Heidrich**
12:15	Lunch
	Part 3: Shading Techniques
1:45	Procedural Solid Texturing **Hart**
2:20	Hardware Shading Effects **Heidrich**
2:55	Using GPUs for Computation **Hart**
3:30	Break
	Part 4: Shading Systems
3:45	3DLabs **Rost**
4:10	ATI **Mitchell**
4:35	NVIDIA **Akeley**
5	Wrap-up - Discussion and Questions and Answers **All**



Sunday, 8 August

2

Color Science and Color Appearance Models for CG, HDTV, and D-cinema

Sunday, Full Day, 8:30 am - 5:30 pm

Petree Hall C

Level: Intermediate

This course introduces the science behind image digitization, tone reproduction, and color reproduction in computer generated-imagery (CGI), HDTV, and digital cinema (D-cinema). It summarizes how color is represented and processed as images are transferred between these domains and details the different forms of nonlinear coding ("gamma") used in CGI, HDTV, and D-cinema. It explains why one system's RGB does not necessarily match the RGB of another system and reviews color specification systems such as CIE XYZ, L*a*b*, L*u*v*, HLS, HSB, and HVC. It describes why coding for color image data has a different set of constraints from color specification, and summarizes color image-coding systems such as RGB, R'G'B', CMY, Y'CBCR, and DPX/Cineon. The course also reviews color measurement instruments such as densitometers and colorimeters, and explains monitor calibration, how color management technology works, and how it is currently being used in motion picture film production (both animation and live action).

In applying color science to image reproduction, the goal is to reproduce images in environments where angular subtense, background, surround, and ambient illumination may differ from the conditions at image origination. Recent advances in color appearance modeling allow quantification of the alterations necessary to reproduce color appearance in different conditions. This course introduces the theory and standards of color appearance models, and describes application of color science and color appearance models to commercial motion imaging in computer graphics, video, HDTV, and D-cinema.

Prerequisites

Some familiarity with color image coding, perhaps gained through attending a color course at a previous SIGGRAPH conference. Attendees should have no fear of mathematics and be experienced in creating or manipulating digital images in CG and/or video.

Intended Audience

Scientists; programmers; visual effects and post-production supervisors; compositors; digital imaging technicians; video, HDTV, and digital cinema engineers.

Organizer

Charles Poynton
poynton@poynton.com

Lecturers

Garrett M. Johnson
Rochester Institute of Technology

Charles Poynton

Schedule

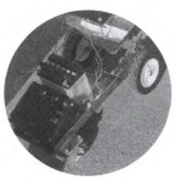
8:30 Tone Reproduction
Poynton

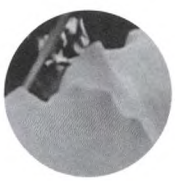
10:30 Color Science
Poynton

1:45 Color Appearance Models
Johnson

3:30 Break

3:45 Color Reproduction in CG, HDTV, and D-cinema
Poynton





Sunday, 8 August

3 **Course 3 is open to all SIGGRAPH 2004 attendees. All other Courses require Full Conference registration.**

Introduction to Computer Graphics

Sunday, Full-Day, 8:30 am - 5:30 pm **Petree Hall D**

Level: Beginning
The SIGGRAPH conference is an exciting event, but it is often an intimidating experience for first-time attendees. There are so many new terms, new concepts, and new products to understand. And all the simultaneous programs leave new attendees baffled and frustrated about how to spend their time.

This course is designed to ease newcomers into the SIGGRAPH conference experience by presenting the fundamental ideas and vocabulary at a level that can be readily understood. Far from dry facts, this course summarizes the fun and excitement that led most of us here in the first place. Attendees learn to understand, appreciate, enjoy, and learn from the rest of the SIGGRAPH 2004 events.

Prerequisites
General knowledge of computers. A small amount of math.

Intended Audience
First-time SIGGRAPH attendees. Anyone who is new to computer graphics and interactive techniques.

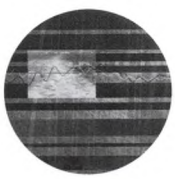
Organizer
Mike Bailey
San Diego Supercomputer Center
University of California, San Diego
mjb@sdsc.edu

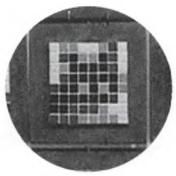
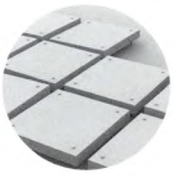
Lecturers
Mike Bailey
San Diego Supercomputer Center
University of California, San Diego

Andrew Glassner
Coyote Wind Films

Schedule

8:30	• Welcome • Course Overview • Graphics Process Overview • Graphics Examples **Bailey and Glassner**
9	Modeling **Bailey and Glassner**
10:15	Break
10:30	Rendering **Bailey and Glassner**
11:30	Graphics Display Hardware **Bailey and Glassner**
12:15	Lunch
1:45	Animation **Bailey and Glassner**
2:45	Scientific Visualization **Bailey and Glassner**
3:30	Break
3:45	More Scientific Visualization **Bailey and Glassner**
4	Virtual Reality **Bailey and Glassner**
4:15	How to Attend a SIGGRAPH **Bailey and Glassner**
4:30	Finding Additional Information **Bailey and Glassner**
4:45	Questions and General Discussion **Bailey and Glassner**



Sunday, 8 August

4

State of the Art in Monte Carlo Global Illumination

Sunday, Full Day, 8:30 am - 5:30 pm **Room 515A**

Level: Intermediate

Realistic image synthesis is increasingly important in areas such as entertainment (movies, special effects, and games), design, architecture, and more. A common trend in all these areas is the quest for more realistic images of increasingly complex models. Monte Carlo global illumination algorithms are the only techniques that can handle this complexity. Recent advances in algorithms and computing power have made Monte Carlo algorithms very practical and a natural choice for most image-synthesis problems.

The purpose of this course is to provide a thorough understanding of the principles of Monte Carlo path-tracing methods and a detailed overview of the most recently developed methods. Part 1 covers the fundamentals of realistic image synthesis (radiometry, rendering equations). Part 2 focuses on the mathematical tools needed to compute integrals using Monte Carlo sampling. Parts 3 and 4 cover specific algorithms that have proven very useful in global illumination rendering.

Prerequisites

A basic understanding of classic photo-realistic rendering algorithms, such as basic ray tracing and radiosity is assumed. Knowledge of probability theory is very helpful. Some familiarity with transport equations and radiometry is useful but not required.

Intended Audience

Students and professionals who are interested in photo-realistic rendering techniques and want to develop their own global-illumination algorithms.

Co-Organizers

Philip Dutré
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Henrik Wann Jensen
University of California, San Diego

Lecturers

Jim Arvo
University of California, Irvine

Kavita Bala
Cornell University

Philippe Bekaert
Universiteit Limburg

Philip Dutré
Katholieke Universiteit Leuven

Henrik Wann Jensen
University of California, San Diego

Steve Marschner
Cornell University

Matt Pharr
NVIDIA Corporation

Schedule

8:30 *Part 1: Fundamentals*
Introduction
Dutré

8:40 Radiometry
Marschner

9:20 The Rendering Equation
Dutré

10:15 Break

10:30 *Part 2: Monte Carlo and Sampling*
Fundamentals of Monte Carlo Integration
Arvo

11:30 Direct Illumination
Bala

12:15 Lunch

1:45 *Part 3: Global Illumination Algorithms 1*
Metropolis Sampling
Pharr

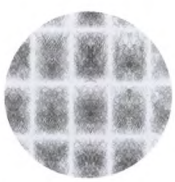
2:30 Biased Monte Carlo Ray Tracing
Jensen

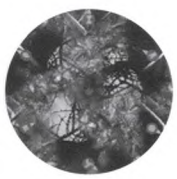
3:30 Break

3:45 *Part 4: Global Illumination Algorithms 2*
Stochastic Radiosity
Bekaert

4:45 Interactive Techniques
Bala

5:25 Summary Statement
Dutré





Sunday, 8 August

5

Facial Modeling and Animation

Sunday, Full-Day, 8:30 am - 5:30 pm **Room 515B**

Level: Intermediate

This overview of the concepts and current techniques in facial modeling and animation begins with a review of history and applications. As a necessary prerequisite for facial modeling, data acquisition is discussed in detail. The course then summarizes basic concepts of facial animation and presents different approaches, including parametric models; performance-, physics-, and learning-based methods; and state-of-the-art techniques such as muscle-based facial animation, mass-spring networks for skin models, and morphable models.

The course also reviews texturing of head models and rendering of skin, addressing problems related to texture synthesis and bump mapping with graphics hardware. Typical applications for facial modeling and animation such as medical and forensic applications (craniofacial surgery simulation, facial reconstruction from skull data, virtual aging) and animation techniques for movie production (case study of "The Matrix Reloaded") are presented and explained.

Prerequisites

Basic computer graphics concepts.

Intended Audience

The target audience includes, but is not limited to, students, researchers, and developers in the area of facial modeling and animation.

Co-Organizers

Jörg Haber
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Demetri Terzopoulos
New York University

Lecturers

Volker Blanz
MPI Informatik

George Borshukov
ESC Entertainment

Jörg Haber
MPI Informatik

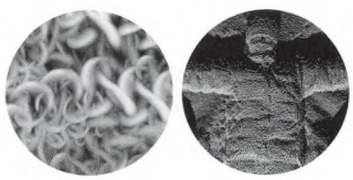
Frederic I. Parke
Texas A&M University

Demetri Terzopoulos
New York University

Lance Williams
Walt Disney Feature Animation

Schedule

8:30	Overview
8:35	History & Applications **Parke**
9:05	Anatomy of the Human Head **Haber**
9:20	Data Acquisition for Facial Modeling **Williams**
10	Overview: Facial Animation Techniques **Blanz**
10:15	Break
10:30	Parametric Models **Parke**
11:10	Performance-based Facial Modeling/Animation **Williams**
11:35	Physically-based Facial Modeling/Animation **Terzopoulos**
12:15	Lunch
1:45	Learning-based Approaches **Blanz**
2:30	Rendering Techniques **Haber**
3	Forensic Applications **Haber**
3:45	Movie Production **Borshukov**
4:45	Medical Applications and Behavioral Models **Terzopoulos**
5:15	Questions and Discussion **All**



Sunday, 8 August

6

Point-Based Computer Graphics

Sunday, Full Day, 8:30 am - 5:30 pm **Room 502A**

Level: Intermediate
Point primitives have experienced a major "renaissance" in recent years, and considerable research has been devoted to efficient representation, modeling, processing, and rendering of point-sampled geometry. There are two main reasons for this new interest in points: First, we have witnessed a dramatic increase in the polygonal complexity of computer graphics models. The overhead of managing, processing, and manipulating very large polygonal-mesh connectivity information has led many leading researchers to question the future utility of polygons as the fundamental graphics primitive. Second, modern 3D digital photography and 3D scanning systems acquire both the geometry and the appearance of complex, real-world objects. These techniques generate huge volumes of point samples, which constitute discrete building blocks of 3D object geometry and appearance, much as pixels are the digital elements for images.

This course presents the latest research results in point-based computer graphics. After an overview of the key research issues, affordable 3D scanning devices are discussed, and novel concepts for mathematical representation of point-sampled shapes are presented. The course describes methods for high-performance and high-quality rendering of point models, including advanced shading, antialiasing, and transparency. It also presents efficient data structures for hierarchical rendering on modern graphics processors and summarizes methods for geometric processing, filtering, and resampling of point models. Other topics include: a framework for shape modeling of point-sampled geometry, including Boolean operations and free-form deformations, and Pointshop3D, an open-source framework that facilitates design of new algorithms for point-based graphics.

Prerequisites
Familiarity with the standard computer graphics techniques for surface representation, modeling, and rendering. No previous knowledge of point-based methods is required.

Intended Audience
Computer graphics researchers who want to learn more about point-based techniques.

Co-Organizers

Markus Gross
Eidgenössische Technische Hochschule Zürich

Hanspeter Pfister
Mitsubishi Electric Research Labs

Matthias Zwicker
Massachusetts Institute of Technology
matthias@graphics.csail.mit.edu

Lecturers

Marc Alexa
Technische Universität Darmstadt

Markus Gross
Eidgenössische Technische Hochschule Zürich

Mark Pauly
Stanford University

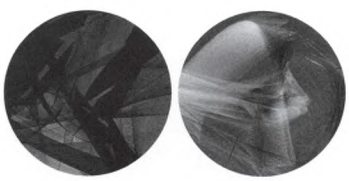
Hanspeter Pfister
Mitsubishi Electric Research Labs

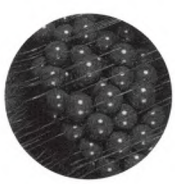
Marc Stamminger
Universität Erlangen-Nürnberg

Matthias Zwicker
Massachusetts Institute of Technology

Schedule

8:30	Introduction **Gross**
8:45	Acquisition of Point-Sampled Geometry and Appearance **Pfister**
9:45	Point Based Surface Representations I **Alexa**
10:15	Break
10:30	Point Based Surface Representations II **Alexa**
11	Algorithms for High Quality Point Rendering **Zwicker**
12:15	Lunch
1:45	Effiecient Data Structures **Stamminger**
2:30	Processing, Sampling and Filtering of Point Models **Gross**
3	Efficient Simplification of Point-Sampled Geometry **Pauly**
3:45	Break
3:45	Pointshop3D: An Interactive System for Point-Based Surface Editing **Gross**
4:15	Shape Modeling of Point-Sampled Geometry **Pauly**
4:45	Pointshop3D Demonstration **Pauly**
5:15	Panel on the Future of Point-Based Computer Graphics **All**





Sunday, 8 August

7

Seeing, Hearing, and Touching: Putting It All Together

Sunday, Full-Day, 8:30 am - 5:30 pm **Room 502B**

Level: Intermediate

How to design interactive media and applications for emerging computer graphics display technologies. Innovations in large-screen displays enable us to present dynamic, high-resolution graphical scenes, but require designers to predict how those scenes will be parsed by users' visual systems. Information and data visualization approaches are increasing in importance, but their effectiveness depends on their ability to support visual cognition. Haptic (touch) techniques offer tangibility, but they must be designed for spatial and temporal touch sensitivity as an independent information channel and as support for user interaction (control intimacy). Bottlenecks in sound perception provide their own characteristic design constraints, and producers must determine whether auditory events are perceived as independent channels (for example, system status, speech, music, and background) or an integrated part of a multichannel event (for example, a collision).

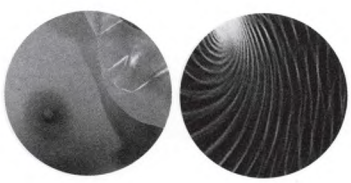
The course is divided into five modules: Seeing, Hearing, Touching, Sensory Integration, and Applications/Design. Each module covers relevant aspects of perceptual theory and its application to design and testing of interaction in step-by-step design case studies. Topics include the cognitive science of intersensory processing (vision, hearing, haptics) in scene understanding and interaction, including attention, change blindness, haptics, ventriloquism, and space constancy; enhanced iterative design (Schön's Reflective Practitioner) for integration of visual display design; haptic devices; and sonified and integrated visual/auditory environments including virtual environments and community/performance spaces.

Prerequisites

Familiarity with the basics of computer graphics and interactive media, a technical background is not required.

Intended Audience

Interaction designers, artists, and academic and industry researchers who have an interest in multimodal interfaces.



Organizer

Brian Fisher
The University of British Columbia
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Lecturers

Sidney Fels
Brian Fisher
Karon MacLean
Tamara Munzner
Ron Rensink
The University of British Columbia

Schedule

8:30 Introduction
Fisher

I. Seeing Module

8:55 Visual Perception
Rensink

9:25 Visualization Perception
Munzner

9:45 Vision Applications/Design
Rensink

10:15 Break

10:30 Visualization Applications/Design
Munzner

II. Hearing Module

11:25 Hearing Psychophysics
Fisher

11:45 Hearing Applications/Design
Fels

12:15 Lunch

III. Touching Module

1:45 Touching: Basics
MacLean

2:15 Touching: Designing With Force Feedback
MacLean

2:35 Touching Applications/Design
Fels

3 Touching Applications
MacLean

3:30 Break

IV. Sensory Integration Module

3:45 Seeing and Hearing Events
Fisher

4 Touching, Seeing, and Hearing
MacLean

4:15 Integrating Applications: Designing for intimacy
Fels

4:40 Sensory Integration: Tight Coupling and Physical Metaphors
MacLean

5:05 Unsolved Problems
All

Sunday, 8 August

8

Multiple-View Geometry for Image-Based Modeling

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

Level: Intermediate

A comprehensive introduction to multiple-view geometry, with a coherent spectrum of algorithms that systematically extract 3D information (motion, structure, and camera calibration) from 2D perspective images. The technical core of the course provides a simple characterization of all constraints among multiple images that can be utilized for 3D reconstruction in a simple matrix rank framework. The course covers essentially all the technical steps and details necessary for the entire reconstruction process: image formation, feature extraction, feature tracking and matching, two-view reconstruction, camera calibration and auto-calibration, multiple-view reconstruction, and incorporation of various types of scene knowledge. It provides a step-by-step recipe for 3D reconstruction from image sequences and demonstrates a real-time 3D motion and structure estimation system, together with its application to real-time virtual insertion in live video. The course also incorporates the most recent developments on reconstruction of dynamic scenes containing multiple moving objects.

Applications of this technology range from special effects (scene or camera motion capture, virtual insertion, image-based modeling and rendering) to computer graphics, photogrammetry, surveillance, autonomous robotics, medical imaging, and virtual reality.

Prerequisites

Basic knowledge of image formation and modeling, 2D and 3D geometry, rigid-body transformations, and linear algebra, as obtainable from experience with image-based rendering or an introductory-level computer vision or graphics course. Unlike traditional treatment of this subject, this course does not require knowledge of tensorial algebra or projective geometry.

Intended Audience

Academicians, graduate students, industrial researchers or developers who are interested in state-of-the-art vision theory and techniques for applications such as 3D modeling, motion capture, visualization, virtual insertion and reality, and video indexing and editing.

Organizer

Yi Ma
University of Illinois at Urbana-Champaign
yima@uiuc.edu

Lecturers

Jana Kosecka
George Mason University

Yi Ma
University of Illinois at Urbana-Champaign

Stefano Soatto
University of California, Los Angeles

Rene Vidal
John Hopkins University

Schedule

Component 1: Image Formation and Primitives

8:30 • Introduction to Multiple-View Geometry
• Imaging Geometry and Image Formation
• Image Primitives and Correspondence
Soatto

10:15 Break

Component 2: Two-View Geometry

10:30 Reconstruction From Two Calibrated Views
Kosecka

11:10 Uncalibrated Geometry and Stratified Reconstruction
Ma

12:15 Lunch

Component 3: Multiple-View Geometry

1:45 Geometry and Algebra of Multiple Views
Vidal

2:35 Multiple-view Reconstruction From Scene Knowledge
Ma

3:30 Break

Component 4: Image-Based Modeling and Motion Segmentation

3:45 Step-by-Step 3D Modeling From Images
Kosecka and Stefano

4:30 Motion and Image Segmentation
Vidal

5:10 Summary, Questions, and Answers
All

9

Photorealistic Hair Modeling, Animation, and Rendering

Sunday, Half Day, 8:30 am - 12:15 pm **West Hall A**

Level: Intermediate
An in-depth review of the three main challenges in hair simulation: hair-styling, hair animation, and hair rendering. It includes an overview of various proposed solutions, their strengths and weaknesses, and the latest methodologies pertaining to each challenge.

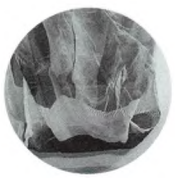
Two novel shape-modeling paradigms for hairstyling (hair as streamlines of fluid flow and multi-resolution definitions of hair) are summarized. For hair dynamics, the course covers an elaborate and viable stiffness-dynamics model of an individual hair strand and presents two novel models for complex hair-hair, hair-body, and hair-air interactions. Hair-rendering topics include shading models, multiple scattering, and volumetric shadows. The course also reviews recent advances in programmable graphics hardware in the context of hair rendering and advanced issues in production hair rendering, self shadowing, and lighting models for short and long hair.

The course concludes with case studies of hair simulation in major academic and entertainment productions: simulation of ancient hairstyling in Pompeii (including a new approach to real-time modeling and animation), "Stuart Little 2," "Harry Potter," "Garfield," "Scooby Doo2," and "Chronicles of Riddick."

Attendees will gain a broad understanding of the state-of-the art in hair simulation and learn a variety of working solutions that they can readily implement in their production pipelines. This course is a "boot camp" for aspiring computer graphics researchers who are interested in physically based modeling in computer graphics.

Prerequisites
Strongly recommended but not required: familiarity with the fundamentals of computer graphics, numerical linear algebra, differential equations, numerical methods, rigid-body dynamics, collision detection and response, physics-based illumination models, and fluid dynamics.

Intended Audience
Graduate students, researchers, computer graphics designers, special effects developers, technical directors, or anyone interested in physically based modeling for computer graphics.



Organizer
Nadia Magnenat-Thalmann
MIRALab, Université de Genève
thalmann@miralab.unige.eh

Lecturers
Armin Bruderlin
Sony Pictures Imageworks

Sunil Hadap
PDI/DreamWorks

Tae-Yong Kim
Rhythm & Hues Studios

Nadia Magnenat-Thalmann
MIRALab, Université de Genève

Ivan Neulander
Hans Rijpkema
Rhythm & Hues Studios

Pascal Volino
MIRALab, Université de Genève

Yizhou Yu
University of Illinois at Urbana-Champaign

Schedule

8:30 State of the Art for Hair
Magnenat-Thalmann

Topic 2: Hair Shape Modeling and Dynamics

8:45 A Multi-resolution Technique for Hairstyling
Kim

9 Continuum Hair Model
Hadap

9:30 Modeling Hair-Hair Interactions Using Sparse Guide Hairs
Yu

10:15 Break

10:30 Modeling Hair Using Free-Form Deformations
Volino

Topic 3: Hair Rendering

10:45 Lighting Hair With High Dynamic Range Images (HDRI) and Algorithms for Hardware Accelerated Hair Rendering
Neulander and Kim

Topic 4: Case Studies

11:10 The Simulation of Ancient Hairstyle in Real-Time
Magnenat-Thalmann

11:20 Production Hair Pipeline at Rhythm & Hues Studios
Rijpkema

11:35 Production Hair/Fur Pipeline at Sony Pictures Imageworks
Bruderlin

Topic 5: Questions and Discussions

12:05 Audience and Speakers

Sunday, 8 August

10

"Lord of the Rings": The Visual Effects That Brought Middle Earth to the Screen

Sunday, Half Day, 1:45 - 5:30 pm

West Hall A

Level: Beginning
Weta Digital's work on the "Lord of the Rings" trilogy involved all aspects of feature-film visual effects, from creature and digital double animation to massive battle scenes, from creation of totally digital environments to the ground-breaking digital performance of Gollum. This course summarizes each of these achievements and offers detailed breakdowns of techniques developed and procedures used in the trilogy.

Prerequisites
Basic understanding of the principles of computer graphics, animation, and visual effects.

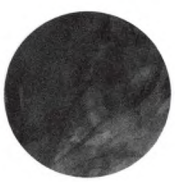
Intended Audience
Anyone who is interested in the current state of digital visual effects and animation for film.

Organizer
Matt Aitken
Weta Digital Ltd
matt@wetafx.co.nz

Lecturers
Matt Aitken
Greg Butler
Dan Lemmon
Dana Peters
Eric Saindon
Guy Williams
Weta Digital Ltd

Schedule

1:45	Introduction	**Aitken**
1:55	Gollum	**Butler and Peters**
2:55	Other Creatures	**Balrog**
3:05	Shelob, Gwaihir	**Aitken and Williams**
3:30	Break	
3:45	Massive	**Aitken**
4:10	Pelennor Fields	**Saindon**
4:20	Mumakil	**Saindon and Peters**
4:40	Digital Doubles	**Lemmon**
4:55	Great Beast, Trolls	**Peters**
5:10	Conclusion	**Aitken**
5:15	Questions and Answers	**All**



Sunday, 8 August

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Tickets are required for entrance to this course. Tickets will be distributed to Full Conference and Sunday One Day Pass registrants beginning at 1 pm outside room 511AB. There is no additional charge for tickets, but they are distributed on a first-come, first-served basis. Attendance is limited. Attendees who have tickets will be seated first after the session break.

Acting and Drawing for Animation

Sunday, Half Day, 1:45 - 5:30 pm

Room 511AB

Level: Beginning

This workshop provides hands-on demonstrations of acting and drawing principles required to achieve strong animated performances. Participants view demonstrations of acting by lecturers and volunteers from the audience, and are invited to try each exercise. Drawing materials are supplied to follow live demonstrations. Examples of strong animation are projected. Larry Lauria, formerly of Disney Institute, demonstates how he works at his animation desk.

The course addresses the following acting-for-animation principles:

- Warming up your instrument - isolation exercises and illusions.
- Trust and collaboration the studio - blindfolds are provided.
- Staging and positioning of characters for good silhouette - motion and drawing.
- Bringing a character to life - the empathy factor.
- Animal motion in human characterization - animal movement and interaction, using animal motion in human walks.
- Walks - mental, emotional, and physical centers.
- Pantomime as a basis for strong dialogue animation - non-verbal iconography and timing, creating illusion.
- The take and double take in physical timing - squash and stretch, timing, trading the focus between two actors.
- Relaxation - contraction and release of all muscles.
- Emotional recall of past events (blindfolded).
- Showing emotion using everyday actions - walking, sitting, standing.

Prerequisites

The only requirements are an open mind and a willingness to participate in guided activities. It helps to have an understanding of the process of animation in either stop-motion, classical, cut-out, experimental film, or 3D media. Acting and dance experience is not required but will be introduced during kinesthetic exercises.

Intended Audience

Animators, producers, graphic artists, game developers, filmmakers, and students should attend. Through guided motion and drawing exercises, all attendees will gain an understanding of methods needed to produce strong animation.

Organizer

Lucilla Potter Hoshor
Savannah College of Art and Design
lhoshor@scad.edu

Lecturers

John C. Finnegan
Purdue University

Lucilla Potter Hoshor
Savannah College of Art and Design

Larry Lauria
Creator, Animation World Network, Toon Institute, Savannah College of Art and Design

Schedule

1:45	Introduction/Welcome Speakers **Lauria, Hoshor and Finnegan**
1:55	Warm Ups • Salutation to the Sun **Hoshor**
2:05	Warm Ups • Squash and Stretch • Facial, Eye, Head and Body Turns **Finnegan and Hoshor**
2:15	Warm Ups • Isolations **Hoshor**
2:25	Trust & Collaboration • Blindfolds and Leading **Finnegan and Hoshor**
2:45	Stage Directions • Together Apart Together **Finnegan and Hoshor**
2:50	Stage Directions • Staging Groups with Thumbnail Drawings **Lauria**
3	Animation Example: "S.A.M." **Winkelman**
3:04	Animal Character Development • Animal Pow Wow **Finnegan and Hoshor**
3:19	Animal Drawing • Compositing Animal & Human Traits in Character Design **Lauria**
3:30	Break
3:45	Understanding Mime • Object Transformations **Finnegan and Hoshor**
4	Understanding Mime • Strong Silhouette in Life Drawing **Lauria and Hoshor**
4:10	Animation Example: "Values" by Van Phan
4:15	Emotional Recall and Projection • Passing the Mask with Takes • Relaxation and Recall of Past Events **Finnegan and Hoshor**
4:45	Emotional Recall and Projection • Adverb Exercise **Finnegan**
5	Emotional Recall and Projection • Staging Emotions **Lauria and Hoshor**
5:10	Animation Example: "Respire" by Jerome Combe
5:15	Questions and Answers

Monday, 9 August

12

Art-Directed Technology: Anatomy of a "Shrek 2" Sequence

Monday, Half Day, 8:30 am - 12:15 pm **West Hall B**

Level: Beginning
New insights into art-directed animation technology and the evolution of a sequence during the production process. This course follows the development of a sequence and introduces recent innovations in pipeline process technology, with an emphasis on how to improve the balance of cinematic goals with production needs. Presenters share the details behind increasing the richness and sophistication of imagery to meet the creative vision and needs of the story.

The course focuses on three key aspects of the art-directed production process:

1. Using story, art, and cimematic goals to tie together and drive the production process.
2. Pushing the technology envelope for better control over stylized realism.
3. Creating a less CG-like experience with art-directed approaches to extensive use of global illumination, among other techniques.

Specifically, the course explains several recent advances in setting up a shot, creation of many complex hair styles, and how to think about and approach blocking, lip sync, smushing of fur, and other aspects of production.

Prerequisites
There are no prerequisites for this course. 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 technical aspects of production of 3D-animated features and who have a basic understanding of the concepts behind computer-generated animation.

Co-Organizers
Rachel Falk
Harry Max
PDI/DreamWorks
hmax@pdi.com

Lecturers
Guillaume Aretos
Tim Cheung
Rachel Falk
Arnauld Lamorlette
Denise Minter
Lucia Modesto
Janet Rentel-Lavin
Conrad Vernon
Nick Walker
PDI/DreamWorks

Schedule

8:30	Introduction and The Big Picture **Falk and Minter**
9	Story/Editorial **Vernon**
9:15	Art/Visual Development **Aretos**
9:35	Character Technical Direction **Modesto**
10:05	Questions
10:15	Break
10:25	Special Effects **Lamorlette**
11:05	• Into Production • Modeling/Surfacing RF/DM • Clothing/Character Effects (Finaling) RF/DM **Falk and Minter**
11:20	Layout **Walker**
11:40	Motion Animation **Cheung**
noon	Lighting **Rentel-Lavin**
12:20	Questions

13

High-Dynamic-Range Imaging

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

Petree Hall D

Level: Intermediate

Current display devices can display a limited range of contrast and colors, which is one of the main reasons that most image acquisition, processing, and display techniques use no more than eight bits per color channel. This course outlines recent advances in high-dynamic-range imaging, from capture to display, that remove this restriction, thereby enabling images to represent the color gamut and dynamic range of the original scene rather than the limited subspace imposed by current monitor technology. This hands-on course teaches how high-dynamic-range images can be captured, the file formats available to store them, and the algorithms required to prepare them for display on low-dynamic-range display devices. The trade-offs at each stage, from capture to display, are assessed, allowing attendees to make informed choices about data-capture techniques, file formats, and tone-reproduction operators. The course also covers recent advances in image-based lighting, in which HDR images can be used to illuminate CG objects and realistically integrate them into real-world scenes. Through practical examples taken from photography and the film industry, it shows the vast improvements in image fidelity afforded by high-dynamic-range imaging.

Prerequisites

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

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).

Organizer

Paul Debevec
USC Institute for Creative Technologies
debevec@ict.usc.edu

Lecturers

Paul Debevec
USC Institute for Creative Technologies

Sumant Pattanaik
University of Central Florida

Erik Reinhard
University of Central Florida

Gregory Ward
Anyhere

Schedule

8:30 Introduction and Overview
Reinhard

8:40 Taking High Dynamic Range Images
Debevec

9:20 HDR Is as Easy as 1-2-3
Ward

10:15 Break

10:30 The Human Visual System and HDR Tone Mapping
Pattanaik

10:50 Tone Reproduction Operators
Reinhard

High Dynamic Range Imaging
Debevec, Reinhard, Ward, and Pattanaik

11:25 HDR Image Based Lighting
Debevec

12:05 Discussion, Question and Answers
All

Monday, 9 August

14

Collision Detection and Proximity Queries

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

Level: Intermediate
An authoritative overview of widely accepted and proved methodologies in collision detection. The course also introduces more advanced or recent topics such as continuous collision detection, ADFs, and using graphics hardware. When appropriate, methods will be tied to familiar applications such as rigid body and cloth simulation.

An essential task of most collision-detection schemes involves determining whether two geometric primitives are intersecting. The course reviews higher-level concepts such as the separating axis theorem and ray intersection. General strategies for efficient implementation of these tests are discussed and concise references to specific tests are provided.

A common problem in many applications that include collision detection is that of temporal aliasing. If objects are moving too fast between collision detection calls, many techniques fail to report a collision. Continuous methods offer a solution to this problem. In addition to being more robust, they have the ability to provide very accurate contact information, which is essential to many simulation applications. The course discusses continuous techniques for deforming and rigid geometry, along with strategies for their efficient implementation.

Adaptively sampled distance fields provide a means to determine penetration depth and direction of collision. The course presents techniques for building ADFs along with their applications and recent advances in GPU-based collision computation.

Prerequisites
Elementary geometry, introduction to data structures, linear algebra, and a penchant for collision detection.

Intended Audience
Practitioners of simulation, VR, haptics and robotics. Effects developers, technical directors, and aspiring researchers of spatial data structures.

Co-Organizers
Dave Eberle
Sunil Hadap
PDI/DreamWorks
sunilhadap@hotmail.com

Lecturers
Dave Eberle
PDI/DreamWorks

Christer Ericson
Sony Computer Entertainment America

Sunil Hadap
PDI/DreamWorks

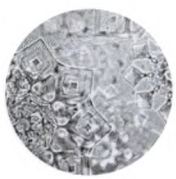
Ming C. Lin
University of North Carolina at Chapel Hill

Stephane Redon
University of North Carolina at Chapel Hill

Pascal Volino
MIRALab, Université de Genève

Schedule

	Session I – Introduction
8:30	Overview **Hadap**
8:55	Primitive Tests **Eberle**
9:20	*Session II - Broadphase and Midphase Optimizations* **Volino**
10	Collision Algorithms for Rigid Bodies **Lin**
10:15	Break
	Session III – Algorithms for Rigid Convex Objects
10:40	Feature Tracking **Lin**
10:55	Gilbert-Johnson-Keerthi (GJK) Algorithm **Ericson**
	Session IV - Advance Topics
11:20	Continuous Collision Detection for Deforming Geometry **Eberle**
11:30	Continuous Collision Detection for Rigid Geometry **Redon**
11:55	Adaptively Sampled Distance Fields **Hadap**
12:05	Collision Detection Using GPU **Lin**



15

Shape-Based Retrieval and Analysis of 3D Models

Monday, Half-Day, 8:30 am - 12:15 pm **Room 515B**

Level: Intermediate

Large repositories of 3D data are rapidly becoming available in several fields, including mechanical CAD, molecular biology, and computer graphics. As the number of 3D models grows, there is an increasing need for computer algorithms to help people find the interesting ones and discover relationships between them. Unfortunately, traditional text-based search techniques are not always effective for 3D models, especially when queries are geometric in nature (for example, search for objects that fit into this space). This course surveys recent methods and applications for representing, matching, indexing, and classifying 3D polygonal models based on their shapes.

After an introduction to shape retrieval and analysis applications, the course focuses on computational representations of shape (shape descriptors). The challenge is to build concise data structures and efficient algorithms with which geometric similarity queries can be answered quickly, discriminating search indices can be built, and interesting shape features can be discovered robustly. The course presents a taxonomy of shape descriptors and provides a roadmap with guidelines for methods that are most suitable for different shape matching and retrieval applications.

The course concludes with a case study of a web-based search engine for 3D polygonal models (a Ġoogle for 3D models). The key challenge is to develop query methods simple enough for novice users and matching algorithms that are robust enough to work for arbitrary polygonal models. The case study considers query interfaces based on text keywords, 2D sketches, 3D sketches, and 3D shapes, and includes results of user studies comparing them.

Prerequisites

Familiarity with basic 3D object representations commonly used in computer graphics, such as polygonal meshes and voxel grids. No prior knowledge of shape analysis is assumed, although familiarity with classical geometric structures and signal processing techniques is helpful.

Intended Audience

Computer graphics researchers and professionals interested in an introduction to the increasingly important field of 3D shape analysis.

Organizer

Thomas Funkhouser
Princeton University
funk@cs.princeton.edu

Lecturers

Thomas Funkhouser
Princeton University

Michael Kazhdan
Princeton University

Schedule

Module 1: Challenges and Methods

8:30 A. Introduction
Funkhouser

8:35 B. Shape Retrieval and Analysis Motivation
Funkhouser

8:55 C. Shape Retrieval Challenges
Funkhouser

9:30 D. Survey of Statistical Shape Descriptors
Kazhdan

10:15 Break

Module 2: Methods and Applications

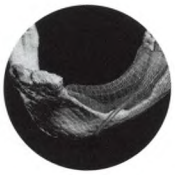
10:30 D. Survey of Statistical Shape Descriptors - Continued
Kazhdan

11 E. Survey of Structural Shape Descriptors
Funkhouser

11:30 F. Case Study: Search Engine for 3D Models
Funkhouser

12 G. Conclusion
Funkhouser






Monday, 9 August

16

Performance OpenGL: Platform-Independent Techniques

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

Level: Intermediate

The purpose of Performance OpenGL is to help all OpenGL programmers become aware of how the OpenGL pipeline's design can lead to optimizations that can help the performance of any OpenGL application. For novice OpenGL programmers, the course hopes to impart some "good habits" that every OpenGL programmer should be aware of and use consistently in their applications. For more advanced OpenGL developers, the course presents platform-independent considerations for deploying applications.

The purpose of this course is not to compare vendors' hardware implementations of the OpenGL pipeline, but to work at a higher level where a change in data format or method of sending data to OpenGL could affect performance. It draws generalizations about performance by conducting experiments on specific OpenGL implementations (which remain anonymous). For example, in almost all cases, passing signed image data into OpenGL yields an order-of-magnitude performance decrease.

Because many programmers use higher-level abstractions like scene graphs, as compared to writing programs that only use OpenGL, the course focuses on how library design can affect OpenGL performance. It reviews how performance is affected by design decisions, including the use of encapsulation for object-oriented languages, and summarizes idioms that may reduce negative effects.

The course also addresses the new directions that OpenGL and graphics hardware are taking, by analyzing the issues, options, and performance characteristics of vertex and fragment shaders in OpenGL.

Prerequisites

Attendees should be comfortable programming with OpenGL and know how to read programs authored in the C programming language. One topic addresses object-oriented programming's encapsulation paradigm, but this section can be appreciated with only a cursory knowledge of the subject.

Intended Audience

Attendees who understand how data flows through the OpenGL pipeline and want to know how best to optimize their portable OpenGL applications.

Organizer

Dave Shreiner
SGI
shreiner@siggraph.org

Lecturers

Brad Grantham
SGI

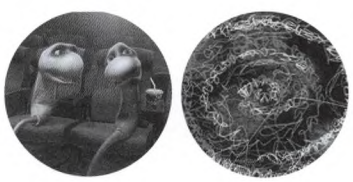
Bob Kuehne
Blue Newt Software

Dave Shreiner
SGI

Thomas True
NVIDIA Corporation

Schedule

8:30	Welcome **Shreiner**
8:40	OpenGL Performance Estimation and Pipeline Overview **Shreiner**
9:20	Performance Bottlenecks: Causes and Cures **Shreiner and Kuehne**
10	GPU Program Evaluation and Performance **Kuehne and True**
11	Application Performance and Case Studies **Grantham and True**
noon	Conclusion, Questions and Answers



Monday, 9 August

17

Unconventional Human-Computer Interfaces

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

Level: Beginning

Most of today's computer systems integrate several modalities in order to provide output to or allow input from users. These systems are mostly focused on visual and auditory output, and control via hand-coupled input devices. The human body, though, offers many more input and output channels, which can enrich the applications of more "traditional" systems that are mostly bound to the desktop. But they can also allow the emergence of new, more experimental systems that surpass today's paradigms on both functional and technical levels.

This course focuses on how we can use the potential of the human body in experimental or unconventional interface techniques. It explores the biological or physiological characteristics of the separate parts of the body, from head to toe, and from skin to heart, showing how their sensor (input) and control (output) capabilities can be applied to human-computer interfaces. It demonstrates a wide variety of applications that use proven interfaces as well as extremely experimental systems. Examples vary from desktop-based to mixed and virtual reality, with applications from areas such as art, entertainment, and science.

Attendees learn to look beyond the restrictions inherent in traditional multimedia systems by discovering and understanding how the human body can reveal great potential for new kinds of applications and systems. Human-body theory and practical knowledge on (hardware) interfaces are balanced with many examples to provide a foundation for assessing and using experimental and unconventional interaction.

Prerequisites

No prerequisites beyond an interest in and basic knowledge of the usage and development of human-computer interfaces.

Intended Audience

People interested in HCI in general, Art Gallery attendees, anyone interested in alternative and experimental usage of computers, and attendees interested in interactive 3D environments.

Co-Organizers

Steffi Beckhaus
Universität Hamburg

Ernst Kruijff
Fraunhofer-Institut für Medienkommunikation
ernst.kruijff@imk.fraunhofer.de

Lecturers

Steffi Beckhaus
Universität Hamburg

Ernst Kruijff
Fraunhofer-Institut für Medienkommunikation

Schedule

8:30 Introduction
Beckhaus and Kruijff

8:40 Reflections on UHCI
Beckhaus and Kruijff

8:50 Human I/O
- Physiological Fundamentals
- Sensors
- Control

Beckhaus and Kruijff

10:15 Break

10:30 Human I/O Continued

11:25 Applying UHCI
- Human Computer Interaction Principles
- Building Your Own Hardware Interface

Beckhaus and Kruijff

12:10 Conclusion and Final Remarks
Beckhaus and Kruijff




Monday, 9 August

18

Commodity-Based Projection VR

Monday, Half Day, 8:30 am - 12:15 pm **Room 501AB**

Level: Beginning
How to build your own commodity-based, projected virtual reality system, and why you might want to do such a thing. This course describes in detail how the presenters have constructed their systems and the options available for various elements (stereoscopic graphics, video projection, audio, tracking, software). It also summarizes how these systems have been used, both in classroom and public environments.

The ultimate possibility is that many more people will have access to interactive, virtual reality hardware and will be able to create their own new applications for it. Immersive, interactive VR is a tool with hypothetically limitless uses, but it is often regarded as something strictly for large research labs and corporations that can afford it. This is not the case; VR can also be used by schools, museums, artists, and others. For these people, this course provides guidance in putting together their own systems.

Major topics include: polarized stereoscopic display, alternative methods of stereo, types and configurations of projectors, types of PC graphics cards, available 3D tracking systems (both commercial and experimental), other input devices, sound hardware, and open source software to drive it all. The presentations summarize the results of years of experience and experimentation with projection-based VR. Pointers to where one can actually obtain all the components are also provided, along with examples of applications that have been created by students and faculty at two universities, and by independent artists.

Prerequisites
Some familiarity with programming interactive graphics; specific experience with virtual reality is not required.

Intended Audience
People who are interested in applying virtual reality to their work in visualization, art, education, etc. but do not have the budget for a packaged, commercial system.

Organizer
Dave Pape
University at Buffalo
dave.pape@acm.org

Lecturers
Josephine Anstey
University at Buffalo

Dave Pape
University at Buffalo

Bill Sherman
NCSA / University of Illinois at Urbana-Champaign

Schedule

8:30 • Introduction
• Goals
Anstey

8:40 • Displays
• Stereoscopy Methods
• Polarized Stereo Details
• Projector Setup
• PC Graphics Cards
Pape

9:25 • Input & Tracking
• 3D Trackers
• Wands & Other Devices
Pape

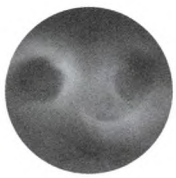
9:55 Applications
Anstey

10:15 Break

10:30 • Sound
• Hardware
• Software
Anstey and Pape

11 • Software
• VR toolkits
• FreeVR programming
• FreeVR configuration
Sherman

noon Questions and Answers



19

A Practical Guide to Ray Tracing and Photon Mapping

Monday, Tutorial, 3:45 - 5:30 pm **West Hall B**

Level: Intermediate

Photon mapping is a practical way of efficiently simulating global illumination, including caustics, color bleeding, participating media, and subsurface scattering in scenes with complicated geometry and advanced material models.

This tutorial provides a detailed description of the ray-tracing and photon-mapping algorithms for simulating global illumination. It provides the practical insight necessary for using and implementing ray tracing and photon mapping. Recent advances in the photon-mapping algorithm are also summarized.

Prerequisites

Knowledge of basic linear algebra and rendering algorithms.

Intended Audience

Artists who use ray tracing and photon mapping, and students and researchers who would like to implement the algorithms and need an overview with an emphasis on practical details.

Organizer and Lecturer

Henrik Wann Jensen
University of California, San Diego
henrik@cs.ucsd.edu

Schedule

3:45 Introduction and Welcome
- Course Overview and Motivation for Attending The Ray Tracing Algorithm
- The Basics of the Ray Tracing Algorithm

Jensen

4:05 Photon Tracing: Building the Photon Maps, Efficient Techniques for Photon Tracing
- Emitting Photons From the Light Sources in the Scene
- The Use of Projection Maps
- Simulating Scattering and Absorption of Photons Using Russian Roulette
- Storing Photons in the Photon Map
- Preparing the Photon Map for Rendering

Jensen

4:40 Rendering Using Photon Mapping: Details on How to Integrate Photon Mapping Into a Ray Tracer, and How to Use it for Rendering of 3D Models

Jensen

Monday, 9 August

20

Color in Information Display: Principles, Perception, and Models

Monday, Tutorial, 3:45 - 5:30 pm **Petree Hall D**

Level: Beginning

Color is a key component of information display that is easy to use badly. As a result, Edward Tufte's key principle for color design is "do no harm." While inspired color design is an art, the principles that underlie good color design have their roots in human perception and a deep understanding of the color properties of different media. Over the last decade, there has been significant progress in providing computational models for color perception. Similarly, substantial research and engineering work has made it easier to predict and control color in digital media. Taken together, these advances provide a foundation that should enable algorithmic application of color that is robust and effective, if still not "inspired."

This tutorial surveys the topics that support this goal and provides pointers for further in-depth exploration. Topics include: principles for the use of color in information display; principles of color design and color harmony; ways to numerically define and transform color, including visual, perceptual, aesthetic, and media-specific "color spaces;" color management systems and their application; and color-appearance fundamentals. The tutorial concludes with an overview of some relevant research, including: automatic generation of color scales, algorithms for mapping names to colors, models for color blindness, and computational models for color appearance.

Prerequisites

This course should be accessible to all SIGGRAPH 2004 attendees who understand basic scientific and mathematical presentation (simple graphs, diagrams, and algebraic equations).

Intended Audience

Primarily engineers and researchers involved in development of systems and algorithms for information display (visualization, illustration, and the visual component of user-interface design). It may also be of interest to digital artists and designers seeking more information about the technical and perceptual factors that affect digital color design.

Organizer and Lecturer

Maureen Stone
StoneSoup Consulting
stone@stonesc.com

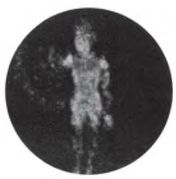
Schedule

3:45 Using Color in Information Display
Stone

4:15 Computational Models for Color
Stone

4:45 Color Appearance and Design
Stone

5:10 Making Color Robust
Stone



21

Introduction to Bayesian Learning

Monday, Tutorial, 3:45 - 5:30 pm **Room 515A**

Level: Intermediate

Sophisticated computer graphics applications require complex models of appearance, motion, natural phenomena, and even artistic style. Such models are often difficult or impossible to design by hand. Recent research demonstrates that, instead, we can "learn" a dynamical and/or appearance model from captured data, and then synthesize realistic new data from the model. For example, we can capture the motions of a human actor and then generate new motions as they might be performed by that actor. Bayesian reasoning is a fundamental tool of machine learning and statistics, and it provides powerful tools for solving otherwise-difficult problems of learning about the world from data. Beginning from first principles, this course develops the general methodologies for designing learning algorithms and describes their application to several problems in graphics.

Prerequisites

Familiarity with linear algebra, calculus, and computer graphics.

Intended Audience

Computer graphics researchers and practitioners working on data-driven computer graphics problems, such as animating shape and motion from video or animating from motion capture.

Organizer and Lecturer

Aaron Hertzmann
University of Toronto
hertzman@dgp.toronto.edu

Schedule

3:45 Introduction
- The Future of Graphics: Data-driven Analysis and Synthesis
- The Need for Bayesian Reasoning

Hertzmann

4 Fundamentals of Bayesian Probabilistic Reasoning
- Classical (Aristotelian) Logic and its Limitations
- Cox Axioms
- Bayes Rule
- Prediction and Parameter Estimation
- Learning Multinomials and Gaussians
- Relation to Least-squares Fitting and Frequentist Methods

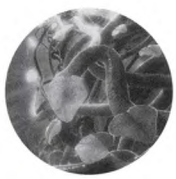
Hertzmann

4:30 How to Design Learning Algorithms
- Generative Models
- The Overfitting Problem in MAP Learning and Least-squares
- Marginalization
- The EM Algorithm at a Glance
- Example: Probabilistic PCA
- Example: Automatic Non-rigid Modeling From Video

Hertzmann

5:15 The Summary and Conclusions
- Pros and Cons of the Bayesian Approach
- Audience Questions

Hertzmann



Monday, 9 August

22

Projectors: Advanced Graphics and Vision Techniques

Monday, Tutorial, 3:45 - 5:30 pm **Room 515B**

Level: Advanced

New advances in projective geometry, computer vision and rendering enable the use of projectors beyond conventional applications like immersive workbenches and tiled large-scale displays. Due to the falling cost of projector and graphics resources, there has been considerable interest in experimenting with projector-based systems in universities, labs, industries, and artworks. A novel class of applications is emerging, involving illumination of complex 3D shapes, dynamic interaction between movable surfaces and projectors, and combining projectors with cameras, trackers, mirrors, and tilt sensors. Since the topics in large-format displays are now mature, this advanced tutorial discusses geometric techniques for using projectors in a range of applications, especially innovative configurations.

Fortunately, only subsets of a large array of techniques are really relevant for projector-based applications. The goal of this course is to present them in a single tutorial in a compact form.

The course describes calibration issues such as estimating the projector model, computing image-transfer functions for planar (via homography) and curved display surfaces. The rendering techniques include device integration (camera, tracker, mirror), image warping for perspectively correct views, illumination of complex geometry, and emerging applications. In addition, the course summarizes practical insights, implementation details (with pseudo-code), and examples for a variety of systems in art, research, and industry.

Prerequisites

General knowledge of 2D and 3D geometric concepts. Basic understanding of computer graphics theory, including perspective projection and rendering, is assumed. Familiarity with video projection and basic concepts in computer vision is helpful but not necessary.

Intended Audience

Artists, designers, and programmers who use or build applications for innovative projector-based systems and want to learn powerful geometric tools.

Organizer and Lecturer

Ramesh Raskar
Mitsubishi Electric Research Laboratories
raskar@merl.com

Schedule

3:45 Introduction
- Projection Model

Raskar

3:55 Calibration
- Parameter Estimation and Robustness
- Image Transfer Functions, Planar and Quadric
- Non-parametric Approaches

Raskar

4:25 Geometric Relationship
- Device Integration, Trackers and Mirrors

Raskar

4:45 Rendering
- Image Generation and Warping
- Multi-projector Seamless Displays
- Projector-based Augmented Reality

Raskar

5:20 Examples and Discussion
Raskar

Monday, 9 August

23

There Can Still Be Only One: Independent Animation Production for the Lonely

Monday, Tutorial, 3:45 - 5:30 pm **Room 502B**

Level: Intermediate

Introduction to professional digital production procedures used in the animation industry and how they can be used by individuals or small groups. Attendees learn the logical order of production, organization, scheduling, and available sources that they will need in order to plan, execute, and distribute an independently produced animation piece. This is a strategic-planning course, not a software or technique course. It shows how to use your own existing skills and talents in an organized and effective manner to achieve the best results from your work.

The course summarizes pre-production concepts and techniques that allow animators to focus on the creative aspects of their projects and avoid time-consuming scheduling mistakes that will cripple production. From concept to design, storyboard to animatic, attendees learn the smartest ways to work, so they can save time, money, and heartache as they seek to realize their visions. Scheduling, resource management, and copyright issues are explored and discussed in the production segment of the course. In the post-production segment, the final edit, output issues, credits, final submission to animation festivals, demo reels, and online submission strategies are addressed. In the end, attendees have a clear, organized plan of execution for their projects.

Prerequisites

General knowledge of computer graphics and at least beginning-level experience in digital animation and design, either 3D or 2D. This course is not software-specific, and where demonstrations are required, several different platforms, packages, and techniques are discussed.

Intended Audience

Undergraduate and graduate students, beginning and intermediate digital animators, whether 2D or 3D, interested professionals, and, especially, independent animators.

Co-Organizers and Lecturers

Kristen Palana
Steve Rittler
William Paterson University
srittler@nyc.rr.com

Schedule

3:45 Introduction
- Course and Topical Overview
- Examples of Several Animations Produced Independently by Steve Rittler and Kristen Palana

Palana and Rittler

4 Pre-production
- Concept
- Story and Character Development; Visual Development and Continuity
- Scheduling and meeting the deadline, Part 1: Budgeting Your Time as Well as Your Money
- Design: Identifying Style
- Storyboarding (Visual Demos)
- Scratch Tracks and Rough Sound: Identifying Sound Resources
- Animatics With Scratch Tracks
- Options for Epics

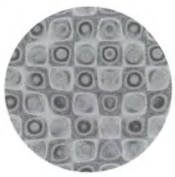
Palana and Rittler

4:40 Universal Production Concerns
- Scheduling and Meeting the Deadline
- Copyright Issues of Sound and Visuals
- Costs, Time Needed
- The Final Edit With Final Sound
- Time-saving Strategies
- Where to Submit and Odds of Being Selected, etc.; Submission Formats vs. Exhibition Formats

Palana and Rittler

5:20 Question and Answers
Palana and Rittler






Monday, 9 August

24

Enhancing Three-Dimensional Vision With Three-Dimensional Sound

Monday, Tutorial, 3:45 - 5:30 pm **Room 501AB**

Level: Intermediate
A thorough introduction to three-dimensional, multi-channel sound. Three-dimensional sound has been neglected in most VR and AR applications, even though it can significantly enhance their realism and immersion. This course explains the main concepts and the most important terms, and provides a detailed overview of the currently available hardware and software. It combines theoretical and practical knowledge on how to apply these technologies in VR and AR systems.

The course begins with a presentation of the history and development of multi-channel and 3D-sound, and an explanation of the differences between the two terms. The next two sections deal with practical issues: an overview of current 3D-sound engines, including a comparison between those engines and a description of currently available sound hardware. In the virtualization section, the course presents a detailed description of the features and backgrounds of the techniques implemented in 3D-sound engines. The course concludes with tips and tricks for implementation of different sound engines for different VR and AR development systems, and a brief summary of the 3deSoundBox, an external acoustic virtualization tool implemented by one of the presenters.

Prerequisites
Knowledge of basic acoustics (frequency, amplitude, etc.) and digital sound (sampling, audio formats, etc.). Familiarity with the basics of programming and experience in programming languages (C(++)) are recommended but not required.

Intended Audience
Developers of VR/AR systems, and anyone interested in real-time acoustics.

Organizer
Philipp Stampfl
AUDITE
stampfl@audite.at

Lecturers
Daniel Dobler
Philipp Stampfl
AUDITE

Schedule

3:45	Welcome & Overview	**Dobler**
4	History of 3D-Sound	**Stampfl**
4:15	3D-Sound Synthesis	**Dobler**
4:35	3D-Sound Hardware	**Stampfl**
4:42	3D-Sound Engines	**Dobler**
4:50	Virtualization	**Stampfl**
5:15	Implementation	**Dobler and Stampfl**

25

Developing Augmented Reality Applications

Tuesday, Full Day, 8:30 am - 5:30 pm

West Hall B

Level: Intermediate

Augmented reality (AR) involves the overlay of virtual images on the real world, and as computers become more and more invisible, it is becoming an increasingly important application area for computer graphics and user-interface design. This course provides a detailed introduction to AR and how to build AR applications, including AR interface design and research, with reviews of important topics such as tracking and registration, interaction, design principles, usability evaluation, and key areas for current and future AR research. Case studies illustrate application areas: gaming, entertainment, medicine, and engineering. Part of the course also involves hands-on demonstrations in which attendees experience the technology for themselves. Significant portions of the course are devoted to reviewing the ARToolKit and Studierstube open-source software tools, which can be used to start building AR applications, as well as other supportive software tools. When they complete this course, attendees will understand the fundamentals of AR interface design, the tools they can use to build their AR applications, and how to evaluate the applications after they are built.

Prerequisites

Interest in computer graphics. Some experience with C/C++ programming. Some experience with the OpenGL API.

Intended Audience

Academic and industrial researchers, and everyone interested in developing AR applications.

Co-Organizers

Mark Billinghurst
University of Canterbury
mark.billinghurst@hitlabnz.org

Dieter Schmalstieg
Technische Universität Wien

Lecturers

Ron Azuma
HRL Laboratories

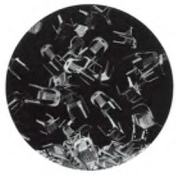
Mark Billinghurst
University of Canterbury

Hirokazu Kato
University of Osaka

Dieter Schmalstieg
Technische Universität Wien

Schedule

8:30	Introduction **Billinghurst**
8:35	Overview **Azuma**
9:25	Tracking **Azuma**
10:15	Break
10:30	AR Interaction Techniques **Billinghurst**
11:15	Designing and Evaluating AR Interfaces **Billinghurst**
12:15	Lunch
1:45	Mobile AR **Schmalstieg**
2:25	Collaborative/Distributed AR **Schmalstieg**
3:10	"Studierstube" Platform **Schmalstieg**
3:30	Break
3:45	"ARToolKit" Platform **Kato**
5	Future Directions **Billinghurst**



Tuesday, 10 August

26

Real-Time Shadowing Techniques

Tuesday, Full Day, 8:30 am - 5:30 pm **Petree Hall D**

Level: Intermediate
Shadows heighten realism and provide important visual cues about the spatial relationships between objects. But integration of robust shadowing techniques in real-time rendering is not an easy task. In this course on how shadows are incorporated in real-time rendering, attendees learn basic shadowing techniques and more advanced techniques that exploit new features of graphics hardware.

The course begins with shadowing techniques using shadow maps. After an introduction to shadow maps and general improvements of this technique (filtering, depth bias, omnidirectional lights, etc.), the first section describes two methods for reducing sampling artifacts: perspective shadow maps and silhouette maps. Both techniques can significantly improve shadow quality, but they require careful implementation. The first section concludes with a discussion of shadow-mapping extensions that allow soft shadows from linear and area light sources. The second part of the course discusses recent advances in efficient and robust implementation of shadow volumes on graphics hardware and then shows how shadow volumes can be extended to generate accurate soft shadows from area lights. Finally, the course summarizes real-time shadowing from full lighting environments using the technique of precomputed radiance transfer.

The course explains the differences among these algorithms and their strengths and weaknesses. Implementation details, often omitted in technical papers, are provided. And throughout the course, the tradeoffs between quality and performance are illustrated for the different techniques.

Prerequisites
Working knowledge of a low-level graphics API such as DirectX or OpenGL. Some knowledge of shadowing algorithms is useful but not required.

Intended Audience
Everyone who is interested in real-time and interactive graphics.

Co-Organizers
Jan Kautz
Massachusetts Institute of Technology
kautz@graphics.csail.mit.edu

Marc Stamminger
Friedrich-Alexander-Universität Erlangen-Nürnberg

Lecturers
Tomas Akenine-Moeller
Lund Institute of Technology

Eric Chan
Massachusetts Institute of Technology

Wolfgang Heidrich
The University of British Columbia

Jan Kautz
Massachusetts Institute of Technology

Mark Kilgard
NVIDIA Corporation

Marc Stamminger
Friedrich-Alexander-Universität Erlangen-Nürnberg

Schedule

8:30	Introduction **Kautz**
8:45	• Component I: Shadow Maps • Perspective Shadow Maps **Stamminger**
10	Silhouette Maps - Part I **Chan**
10:15	Break
10:30	Silhouette Maps - Part II **Chan**
10:55	Linear Light Sources **Heidrich**
11:35	Smoothies **Chan**
12:15	Lunch
1:45	Component II: Shadow Volumes **Kilgard**
2:45	Soft Shadow Volumes - Part I **Akenine-Moeller**
3:30	Break
3:45	Soft Shadow Volumes - Part II **Akenine-Moeller**
4	Component III: Radiance Transfer Shadows **Kautz**
5	Conclusions, Questions and Answers **All**

Tuesday, 10 August

27

Level Set and PDE Methods for Computer Graphics

Tuesday, Full Day, 8:30 am - 5:30 pm

Room 515A

Level: Advanced

Level set methods, an important class of partial differential equation (PDE) methods, define dynamic surfaces implicitly as the level set (iso-surface) of a sampled, evolving nD function. This course is designed for researchers who are interested in learning about level set and other PDE-based methods, and their application to computer graphics, computer animation, geometric modeling, and computer vision. The course material is presented by several recognized experts in the field and includes introductory concepts, practical considerations, and extensive details on a variety of level set/PDE applications.

The course begins with preparatory material that introduces the concept of using partial differential equations to solve problems in computer graphics, geometric modeling, and computer vision, including the structure and behavior of several different types of differential equations (for example, the level set equation and the heat equation) as well as a general approach to developing PDE-based applications. The second stage of the course describes the numerical methods and algorithms needed to actually implement the mathematics and methods presented in the first stage. The course closes with detailed presentations on several level set/PDE applications, including image/video inpainting, pattern formation, image/volume processing, 3D shape reconstruction, image/volume segmentation, image/shape morphing, geometric modeling, anisotropic diffusion, and simulation of natural phenomena.

Prerequisites

A working knowledge of calculus, linear algebra, computer graphics, geometric modeling, and computer vision. Some familiarity with differential geometry, differential equations, numerical computing and image processing is strongly recommended, but not required.

Intended Audience

Students, researchers, and practitioners who want to learn about level set/PDE methods in order to employ them in computer graphics, image processing, and geometric modeling applications.

Organizer

David Breen
Drexel University
david@cs.drexel.edu

Lecturers

David Breen
Drexel University

Ron Fedkiw
Stanford University

Ken Museth
Linköping University

Stanley Osher
University of California, Los Angeles

Guillermo Sapiro
University of Minnesota

Ross Whitaker
University of Utah

Schedule

Session 1 - PDE and Level Set Fundamentals

8:30 Welcome
Breen

8:40 Introduction to PDEs and Their Application to Imaging
Sapiro

9:40 Introduction to Level Set Methods
Osher

10:15 Break

Session 2 – Numerical Methods and Applications

10:30 Dynamic Visibility in an Implicit Framework
Osher

11 Level Set Numerical Methods
Whitaker

11:25 Level Set Surface Reconstruction and Processing
Whitaker

11:55 Level Set Methods on a Streaming Architecture
Whitaker

12:15 Lunch

Session 3 – PDE/Level Set Applications

1:45 Image Inpainting
Sapiro

2:15 Computing Generalized Geodesics for Computer Graphics
Sapiro

2:45 Algorithms for Level Set Modeling
Museth

3:10 Level Set Surface Editing Operators
Museth

3:30 Break

Session 4 - Level Set Segmentation and Simulation

3:45 3D Volume Segmentation (Framework, Multiple Non-uniform Datasets, Diffusion Tensor MRI, Sinograms)
Breen

4:30 Simulation of Water, Fire and Smoke
Fedkiw

Tuesday, 10 August

28

Real-Time Volume Graphics

Tuesday, Full Day, 8:30 am - 5:30 pm **Room 515B**

Level: Intermediate
The tremendous evolution of programmable graphics hardware has made high-quality, real-time volume graphics a reality. In addition to the traditional application of rendering volume data in scientific visualization, interest in applying these techniques for real-time rendering of atmospheric phenomena and participating media such as fire, smoke, and clouds is growing rapidly. This course covers both applications in scientific visualization (for example, medical volume data) and real-time rendering (for example, advanced effects and illumination in computer games), in detail. Attendees learn techniques for harnessing the power of consumer-grade graphics hardware and high-level shading languages for real-time rendering of volumetric data and effects. Beginning with basic texture-based approaches including hardware ray casting, the algorithms are improved and expanded incrementally, covering local and global illumination, scattering, pre-integration, implicit surfaces and non-polygonal isosurfaces, transfer function design, volume animation and deformation, dealing with large volumes, high-quality volume clipping, rendering segmented volumes, higher-order filtering, and non-photorealistic volume rendering. Attendees receive documented source code covering details that are usually omitted in publications.

Prerequisites
Working knowledge of computer graphics and some background in graphics programming APIs like OpenGL or DirectX. Familiarity with basic visualization techniques is helpful but not required.

Intended Audience
Practitioners in both scientific visualization and real-time rendering, including the entertainment community.

Co-Organizers
Markus Hadwiger
VRVis Research Center
msh@vrvis.at

Christof Rezk-Salama
Universität Siegen

Lecturers
Klaus Engel
Siemens Corporate Research Princeton

Markus Hadwiger
VRVis Research Center

Joe M. Kniss
University of Utah

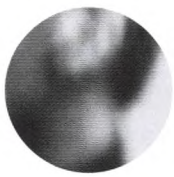
Aaron E. Lefohn
University of California, Davis

Christof Rezk-Salama
Universität Siegen

Daniel Weiskopf
Universität Stuttgart

Schedule

8:30	Welcome and Speaker Introduction Introduction to GPU-Based Volume Rendering **Rezk-Salama**
9:40	GPU-Based Ray Casting **Weiskopf**
10:15	Break
10:30	Local Illumination for Volumes **Hadwiger**
10:55	Transfer Function Design: Classification **Kniss**
11:20	Transfer Function Design: Optical Properties **Kniss**
11:45	Pre-Integration and High-Quality Filtering **Engel**
12:15	Lunch
1:45	Atmospheric Effects, Participating Media, and Scattering **Kniss**
2:30	High-Quality Volume Clipping **Weiskopf**
3	Non-Photorealistic Volume Rendering and Segmented Volumes **Hadwiger**
3:30	Break
3:45	Volume Deformation and Animation **Rezk-Salama**
4:15	Dealing With Large Volumes **Engel**
4:45	Rendering From Difficult Data Formats **Lefohn**
5:15	Summary, Questions and Answers **All**




29 Hands-On

Hands-On course rooms include tables, power strips, and wireless network access.

An Interactive Introduction to OpenGL Programming

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

Room 502B

Level: Beginning

OpenGL is the most widely available programming library for computer graphics applications and is used in almost every aspect of computer graphics: research, scientific visualization, entertainment and visual effects, computer-aided design, interactive gaming, and many more. This course provides an accelerated introduction to creating applications with the OpenGL application programming interface (API).

The course introduces OpenGL's operation through more than just code snippets and static images. It utilizes several applications that introduce various subsets of the OpenGL API (for example, lighting or texture mapping), so participants can interactively modify the values passed into OpenGL and immediately see the resulting images.

The course takes a beginning OpenGL programmer from the basics of what's required for OpenGL's operation to advanced topics like using the stencil buffer and programming with OpenGL extensions. It reviews the most-used features of OpenGL and how to utilize those in applications.

Topics include how OpenGL represents geometric objects; how lighting, texture mapping, anti-aliasing, and other supported features are applied; and how to use pixel images in the context of elementary image processing; and how to use imagery for texture maps. Advanced topics not appropriate for detailed discussion in an introductory course are introduced with references for further study.

Prerequisites

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

Intended Audience

Anyone interested in learning how to author applications using OpenGL. Attendees will learn enough to write interactive OpenGL applications with moving, lit, textured 3D objects.

Hardware

If you want to participate in hands-on courses, you should bring your laptop computer equipped with wireless card to hands-on courses. A limited quantity of laptops is also available from AVW-TELAV, the official SIGGRAPH 2004 computer-rental contractor, at the Speaker Preparation area in West Hall A. The rental fee is $99 per day, and charge approval on a valid credit card is required as a deposit. Rental laptops include Windows and Office XP. Hands-On Course software can be installed in the Speaker Prep area. Computer rentals are available only through AVW-TELAV, not SIGGRAPH 2004.

Software

Course 29 tutorials and source code are available from:
www.daveshreiner.com/s2004/

System requirements: (Items MUST be installed before attending the course)

- Windows: base operating system only (Windows PC running Windows 95 or higher)
- Linux: either Mesa, or proprietary OpenGL drivers from the hardware vendor. (Intel-based system running Linux.)

Course attendees should have access to a web browser for distribution of software that will be provided when the course begins. Also recommended for the course is a PDF reader for review of tutorial material.

Organizer

Dave Shreiner
SGI
shreiner@siggraph.org

Lecturers

Ed Angel
University of New Mexico

Dave Shreiner
Vicki Shreiner
SGI

Schedule

8:30	Welcome **D. Shreiner**
8:35	Getting Started With OpenGL **V. Shreiner**
9	Working With Objects in OpenGL **V. Shreiner**
9:45	Lighting **D. Shreiner**
10:15	Texture Mapping **D. Shreiner and Angel**
11:30	Framebuffer Tricks **Angel**
noon	Conclusion, Questions and Answers **All**

Tuesday, 10 August

30 Hands-On

Hands-On course rooms include tables, power strips, and wireless network access.

Visualizing Geospatial Data

Tuesday, Half Day, 1:45 - 5:30 pm **Room 502B**

Level: Intermediate
This course is divided into two components:

1. Overview of integrating geospatial data with visualization methods. This component focuses on four levels of integrating geospatial data and geographic information systems (GIS) with scientific and information visualization (VIS) methods:

- Rudimentary: minimal data sharing between the GIS and Vis systems.
- Operational: consistency of geospatial data.
- Functional: transparent communication between the GIS and Vis systems.
- Merged: one comprehensive toolkit environment.

2. New directions in distributed geovisualization. The second component focuses on distributed geovisualization, including distribution of visualization operations among components and physical locations, and distribution of interaction with the visual tools among users. The course reviews development of highly interactive geovisualization tools that allow investigators, located at remote sites, to collaborate via the internet; building user interfaces that support same- and different-place real-time decision making and crisis management using vast geospatial data resources. It highlights appropriate visual-display techniques and data-mining methods of geospatial data across heterogenous platforms that encompass high-end servers, desktop computers, laptops, personal digital assistants, cell phones, and other devices. It then demonstrates GeoVISTA Studio, a Java, component-based, open software environment developed at Pennsylvania State University and distributed through SorceForge.

Prerequisites
Experience in working with geospatial data is helpful as is familiarity with scientific and/or information visualization terminology.

Intended Audience
Scientific researchers, educators, and computer graphics specialists interested in exploring particular issues associated with handling the visual display of cartographic, geospatial, and geoinformatics data.

Hardware
If you want to participate in hands-on courses, you should bring your laptop computer equipped with wireless card to hands-on courses. A limited quantity of laptops is also available from AVW-TELAV, the official SIGGRAPH 2004 computer-rental contractor, at the Speaker Preparation area in West Hall A. The rental fee is $99 per day, and charge approval on a valid credit card is required as a deposit. Rental laptops include Windows and Office XP. Hands-On Course software can be installed in the Speaker Prep area. Computer rentals are available only through AVW-TELAV, not SIGGRAPH 2004.

Software
Software Requirements: (These files MUST be installed before you attend the course)

- A Quicktime Movie plug-in for your web browser is required for viewing some online content. Download Apple Computer's free Quicktime Movie plug-in here.
- A VRML plug-in for your web browser is required for viewing some online content.

Other software recommended for this course includes Java plug-in for browsers (1.3 or better) and a PDF reader for review of tutorial material.

Organizer
Theresa-Marie Rhyne
North Carolina State University
tmrhyne@ncsu.edu

Lecturers
Theresa-Marie Rhyne
North Carolina State University

Alan MacEachren
Pennsylvania State University

Schedule

1:45	• Introduction • Organization Remarks **Rhyne**
1:50	Topic #1: Overview of Integrating Geospatial Data With Visualization Methods **Rhyne**
2:50	Case Study #1: GeoVRML Applications for Landscape Planning & Visibility Studies **Rhyne**
3:30	Break
3:45	Topic #2: New Directions in Distributed GeoVisualization **MacEachren**
4:45	Case Study #2: The GeoVISTA Studio Project **MacEachren**
5:15	Wrap-Up Discussion **Rhyne and MacEachren**

31

The Elements of Nature: Interactive and Realistic Techniques

Wednesday, Full Day, 8:30 am - 5:30 pm

West Hall B

Level: Intermediate

This updated course on simulating natural phenomena covers the latest research and production techniques for simulating most of the elements of nature. The presenters provide movie production, interactive simulation, and research perspectives on the difficult task of photorealistic modeling, rendering, and animation of natural phenomena. The course offers a balance of the latest interactive graphics hardware-based simulation techniques and the latest physics-based simulation techniques. It includes interactive implementations and approximations of complex physics-based simulations, as well as procedural approximations and combined hybrid techniques. Interactive demonstrations and discussions of implementation details impart a working knowledge of these techniques that can't be acquired by reading papers on the topics.

Prerequisites

Familiarity with standard graphics techniques for modeling and rendering. Knowledge of basic grammar-based modeling, physics-based modeling, and particle systems is helpful but not required.

Intended Audience

Researchers, animators, software developers, game software developers, production software developers, and students.

Organizer

David Ebert
Purdue University
ebertd@purdue.edu

Lecturers

Oliver Deussen
Universität Konstanz

David Ebert
Purdue University

Ron Fedkiw
Stanford University

Ken Musgrave
Pandromeda Inc.

Przemyslaw Prusinkiewicz
University of Calgary

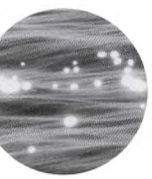
Doug Roble
Digital Domain

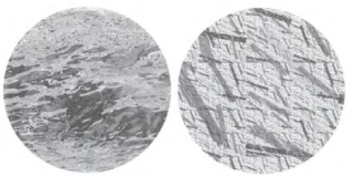
Jos Stam
Alias

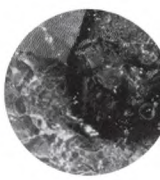
Jerry Tessendorf
Rhythm & Hues Studios

Schedule

8:30	Introduction **Ebert**
8:40	Simulating Ocean Surfaces **Tessendorf**
9:30	Fast Stable Solution Techniques for Computational Fluid Dynamics **Stam**
10:15	Break
10:30	Realistic Physics-based Smoke and Fire Simulation **Fedkiw**
11:25	Fluid Simulation in Production **Roble**
12:15	Lunch
1:45	Interactive Cloud Modeling and Photorealistic Atmospheric Rendering **Ebert**
3:30	Break
3:45	Fractal Landscapes in Their Natural Context **Musgrave**
4	Realistic Modeling and Visualization of Plants **Prusinkiewicz**
4:40	Fast Rendering and Modeling of Plants **Deussen**







Wednesday, 11 August

32

GPGPU: General-Purpose Computation on Graphics Hardware

Wednesday, Full Day, 8:30 am - 5:30 pm **Petree Hall D**

Level: Intermediate

The graphics processor (GPU) on today's commodity video cards has evolved into an extremely powerful and flexible system. The latest graphics architectures provide tremendous memory bandwidth and computational horsepower, with fully programmable vertex and pixel processing units that support vector operations up to full IEEE floating-point precision. High-level languages have emerged for graphics hardware, making this computational power accessible. Researchers have found that exploiting the GPU can accelerate some problems by more than an order of magnitude over the CPU.

However, significant barriers still exist for the developer who wishes to use the inexpensive power of commodity graphics hardware, whether for in-game simulation of physics or for conventional computational science. These chips are designed for and driven by video game development; the programming model is unusual, the programming environment is tightly constrained, and the underlying architectures are largely secret. The GPU developer must be an expert in computer graphics and its computational idioms to make effective use of the hardware, and still pitfalls abound. This course provides a detailed introduction to general-purpose computation on graphics hardware (GPGPU). It emphasizes core computational building blocks, ranging from linear algebra to database queries, and reviews the tools, perils, and tricks of the trade in GPU programming.

The course presenters are experts on general-purpose GPU computation from academia and industry, and have presented papers and tutorials on the topic at the annual SIGGRAPH conference, Graphics Hardware, Game Developers Conference, and elsewhere.

Prerequisites

Attendees are expected to have experience with a modern graphics API such as OpenGL or Direct 3D, including basic experience in programming vertex and pixel shaders.

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
luebke@cs.virginia.edu

Lecturers

Ian Buck
Stanford University

Naga Govindaraju
University of North Carolina at Chapel Hill

Mark Harris
NVIDIA Corporation

Jens Krüger
Technische Universität München

Aaron E. Lefohn
University of California, Davis

David Luebke
University of Virginia

Timothy J. Purcell
Stanford University,
NVIDIA Corporation

Cliff Woolley
University of Virginia

Schedule

8:30 Welcome and Introduction
Luebke

9 Mapping Computational Concepts to the GPU
Harris

GPGPU Building Blocks

9:20 Linear Algebra
Krüger

9:55 Sorting and Searching
Purcell

10:15 Break

10:30 Sorting and Searching Continued
Purcell

10:45 Database Operations
Govindaraju

Languages and Tools

11:15 High-level Languages
Buck

11:45 Debugging Tools
Purcell

12:15 Lunch

Effective GPGPU Programming

1:45 Efficient Data-parallel GPU Programming
Woolley

2:15 Data Formatting and Addressing
Lefohn

2:45 GPU Computation Strategies & Tricks
Buck

3:30 Break

Case Studies

3:45 Physically-based Simulation on GPUs
Harris

4:10 Tone Mapping on GPUs
Woolley

4:35 Level Sets on GPUs
Lefohn

5 Global Illumination on GPUs
Purcell

Wednesday, 11 August

33

Crowd and Group Animation

Wednesday, Full Day, 8:30 am - 5:30 pm

Room 515A

Level: Intermediate

A continuous challenge for special effects in movies is the production of realistic virtual crowds. This course presents state-of-the-art techniques and methods and explains in detail the different approaches to creating virtual crowds: particle systems with flocking techniques, using attraction and repulsion forces, copy-and-paste techniques, agent-based methods, and architecture of software tools, including the MASSIVE software used for the "Lord of the Rings" trilogy.

The course explores essential aspects of generating virtual crowds. In particular, it presents issues related to information (intentions, status, and knowledge), behavior (innate, group, complex, and guided), and control (programmed, autonomous, and guided). It emphasizes essential concepts such as sensory input (vision, audition, tactile), versatile motion control, artificial intelligence level, and rendering techniques.

The course also reviews the new challenge in production of real-time crowds for games, VR systems for training and simulation, and augmented reality applications for cultural heritage (for example, adding virtual audiences in Roman or Greek theaters).

The course is illustrated with many examples from recent movies ("Star Wars," "Lord of the Rings," "Shrek") and real-time applications in emergency situations and cultural heritage.

Prerequisites

Experience with computer animation is recommended but not mandatory.

Intended Audience

Animators and designers.

Organizer

Daniel Thalmann
Swiss Federal Institute of Technology (EPFL)
daniel.thalmann@epfl.ch

Lecturers

Christophe Hery
Industrial Light + Magic

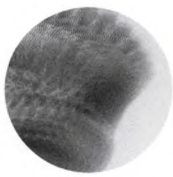
Seth Lippman
PDI/DreamWorks

Hiromi Ono
Industrial Light + Magic

Stephen Regelous
Massive Software

Douglas Sutton
Industrial Light + Magic

Daniel Thalmann
Swiss Federal Institute of Technology (EPFL)



Schedule

8:30
- Virtual Humans: Individuals, Groups, and Crowds
- Crowd Concepts
- State-of-the-Art
- ViCrowd
- Acceleration techniques for rendering
- Motion Control
- Intelligence, Perception and Memory

Thalmann

9:30
- Real-time Crowds
- Introduction
- System design
- Behaviors
- Rendering
- Authoring
- Applications: VR training, Virtual Heritage
- Future

Thalmann

10:30
- Introduction
- From Choreography to Rendering (Overview of ILM's Crowd System)
- Example of Behavior From Episode 2 Arena Sequence
- Example of Terrain Adaptation From Episode 2 Battle Sequence
- Example of Herding in Jurassic Park 3
- Example of Flocking in Van Helsing
- Conclusion

Hery, Ono, and Sutton

12:15 Lunch

1:45 Shrek2 Crowd Demo Reel
Lippman

1:50 Quick Summary of the New Technologies and Techniques Used in Shrek 2 Crowds
Lippman

2:05
- Expanded Geometric Variations
- Expanded Material Variations
- Weighting of Rule Influences
- Model Storage Format (Proprietary Compression Format)
- Integration of Scatter Tool for Initial Layout of Crowd Characters
- DCCs (Dynamic Crowd Character)
- Hair/Fur Generation

Lippman

2:25
- Mob System Overview:
- Motion (Who, What, and Where)
- Rendering

Lippman

2:45
- Details of the New Technologies and Techniques Used in Shrek 2 Crowds:
- Expanded Geometric Variations
- Expanded Material Variations
- Weighting of Rule Influences
- Model Storage Format (Proprietary Compression Format)
- Integration of Scatter Brain for Initial Layout of Crowd Characters
- DCCs (Dynamic Crowd Character)
- Hair/Fur Generation

Lippman

3:15 Shot Breakdown - 2700 / 5
Lippman

3:35 Break

3:45
- Autonomous Agents
- Autonomy
- Reactivity
- Emotions
- Personality
- Mobility
- Sensory models
- A.I. and A-Life methods
- A.I. methods
- A-Life methods
- Emergent behaviors
- Crowds for film
- MASSIVE
- Embodied agents
- Fuzzy logic
- High level control
- Low level control
- Integration
- Motion fidelity
- Terrain adaptation
- Flocking
- A.I. in Massive

Regelous

Papers

The premier international forum for ground-breaking, provocative, and important new work in computer graphics and interactive techniques. SIGGRAPH 2004 papers set the standard in the field, stimulate future trends, and explore challenging issues in related fields: human-computer interaction, computer-aided design, computer vision, robotics, visualization, web graphics, and computer games, among others.

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SIGGRAPH 2005 Papers Chair
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Hans-Peter Seidel
Max-Planck-Institut für Informatik

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Yale University

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NVIDIA Corporation

Roberto Scopigno
Istituto Scienza e Tecnologie dell'Informazione - C.N.R.

Hans-Peter Seidel
Max-Planck-Institut für Informatik

Peter Shirley
University of Utah

Peter-Pike Sloan
Microsoft Corporation

Jos Stam
Alias

Marc Stamminger
University of Erlangen-Nuremberg

Richard Szeliski
Microsoft Research

Jack Tumblin
Northwestern University

Denis Zorin
New York University

Monday, 9 August

8:30 - 10:15 am
West Hall A

Graphics is Fun

Session Chair
Frédo Durand
Massachusetts Institute of Technology

- Graphics Gems Revisited: Fast and Physically Based Rendering of Gemstones
  Stephane Guy
  PRIMA-GRAVIR/IMAG-INRIA
  stephane.guy@inrialpes.fr

  Cyril Soler
  ARTIS-GRAVIR/IMAG-INRIA

- Band Moiré Images
  Roger D. Hersch
  Sylvain Chosson
  École polytechnique fédérale de Lausanne
  rd.hersch@epfl.ch

- Perceptual Audio Rendering of Complex Virtual Environments
  Nicolas Tsingos
  Emmanuel Gallo
  George Drettakis
  REVES, INRIA Sophia Antipolis
  Nicolas.Tsingos@sophia.inria.fr

- Making Papercraft Toys From Meshes Using Strip-Based Approximate Unfolding
  Jun Mitani
  Hiromasa Suzuki
  The University of Tokyo
  mitani@cim.pe.u-tokyo.ac.jp

8:30 - 10:15 am
Petree Hall C

Curves & Surfaces

Session Chair
Marc Alexa
Technische Universität Darmstadt

- Defining Point-Set Surfaces
  Nina Amenta
  Yong Joo Kil
  University of California, Davis
  amenta@cs.ucdavis.edu

- A Simple Manifold-Based Construction of Surfaces of Arbitrary Smoothness
  Lexing Ying
  Denis Zorin
  New York University
  lexing@mrl.nyu.edu

- T-Spline Simplification and Local Refinement
  Thomas W. Sederberg
  David L. Cardon
  G. Thomas Finnigan
  Nicholas S. North
  Brigham Young University
  tom@cs.byu.edu

  Jianmin Zheng Nanyang
  Technological University

  Tom Lyche
  Oslo University

- Energy-Minimizing Splines in Manifolds
  Michael Hofer
  Helmut Pottmann
  Technische Universität Wien
  hofer@geometrie.tuwien.ac.at

10:30 am - 12:15 pm
West Hall A

Interacting With Images

Session Chair
Aaron Hertzmann
University of Toronto

- Interactive Digital Photomontage
  Aseem Agarwala
  Mira Dontcheva
  University of Washington
  aseem@cs.washington.edu

  Maneesh Agrawala
  Steven Drucker
  Alex Colburn
  Microsoft Research

  Brian Curless
  University of Washington

  David H. Salesin
  University of Washington/
  Microsoft Research

  Michael F. Cohen
  Microsoft Research

- Lazy Snapping
  Yin Li
  Hong Kong University of Science and Technology
  liyin@cs.ust.hk

  Jian Sun
  Microsoft Research Asia

  Chi-Keung Tang
  Hong Kong University of Science and Technology

  Heung-Yeung Shum
  Microsoft Research Asia

- GrabCut - Interactive Foreground Extraction Using Iterated Graph Cuts
  Carsten Rother
  Andrew Blake
  Vladimir Kolmogorov
  Microsoft Research Ltd.
  carrot@microsoft.com

- Poisson Matting
  Jian Sun
  Microsoft Research Asia
  t-jiansu@microsoft.com

  Jiaya Jia
  Chi-Keung Tang
  Hong Kong University of Science and Technology

  Heung-Yeung Shum
  Microsoft Research Asia

10:30 am - 12:15 pm
Petree Hall C

3D Texture

Session Chair
Julie Dorsey
Yale University

- Volumetric Illustration: Designing 3D Models with Internal Textures
  Shigeru Owada
  University of Tokyo
  ohwada@is.s.u-tokyo.ac.jp

  Frank Nielsen
  Sony Computer Science Laboratories, Inc.

  Makoto Okabe
  The University of Tokyo/Sony Computer Science Laboratories, Inc.

  Takeo Igarashi
  The University of Tokyo

- Stereological Techniques for Solid Textures
  Robert Jagnow
  Massachusetts Institute of Technology
  rjagnow@graphics.lcs.mit.edu

  Julie Dorsey
  Yale University

  Holly Rushmeier
  IBM T.J. Watson Research Center

- Multilinear Image-Based Rendering
  M. Alex O. Vasilescu
  University of Toronto
  maov@mrl.nyu.edu

  Demetri Terzopoulos
  New York University

- Shell Texture Functions
  Yanyun Chen
  Xin Tong
  Stephen Lin
  Microsoft Research Asia
  t-yachen@microsoft.com

  Jiaping Wang
  Institute of Computing Technology, Chinese Academy of Sciences

  Baining Guo
  Heung-Yeung Shum
  Microsoft Research Asia

Monday, 9 August

3:45 - 5:30 pm
West Hall A

Photo & Video Texture

Session Chair
Dani Lischinski
The Hebrew University of Jerusalem

- Textureshop: Texture Synthesis as a Photograph Editing Tool
  Hui Fang
  John C. Hart
  University of Illinois at Urbana-Champaign
  huifang@uiuc.edu

- Flow-Based Video Synthesis and Editing
  Kiran S. Bhat
  Carnegie Mellon University
  kbhat@cs.washington.edu

  Steven M. Seitz
  University of Washington

  Jessica K. Hodgins
  Pradeep K. Khosla
  Carnegie Mellon University

- Feature Matching and Deformation for Texture Synthesis
  Qing Wu
  Yizhou Yu
  University of Illinois at Urbana-Champaign
  qingwu1@uiuc.edu

- Near-Regular Texture Analysis and Manipulation
  Yanxi Liu
  Wen-Chieh Lin
  James Hays
  Carnegie Mellon University
  yanxi@cs.cmu.edu

Tuesday, 10 August

8:30 - 10:15 am
West Hall A

Dynamics & Modeling

Session Chair
Jovan Popović
Massachusetts Institute of Technology

- Rigid Fluid: Animating the Interplay Between Rigid Bodies and Fluid
  Mark Carlson
  Peter J. Mucha
  Greg Turk
  Georgia Institute of Technology
  carlson@cc.gatech.edu

- A Virtual Node Algorithm for Changing Mesh Topology During Simulation
  Neil Molino
  Zhaosheng Bao
  Stanford University
  npmolino@stanford.edu

  Ronald Fedkiw
  Stanford University/Industrial Light + Magic

- BD-Tree: Output-Sensitive Collision Detection for Reduced Deformable Models
  Doug L. James
  Carnegie Mellon University
  djames@cs.cmu.edu

  Dinesh K. Pai
  Rutgers University

- Deformation Transfer for Triangle Meshes
  Robert W. Sumner
  Jovan Popović
  Massachusetts Institute of Technology
  sumner@graphics.csail.mit.edu

10:30 am - 12:15 pm
West Hall A

Identifying & Sketching the Future

Session Chair
Maneesh Agrawala
Microsoft Research

- RFIG Lamps: Interacting With a Self-Describing World via Photosensing Wireless Tags and Projectors
  Ramesh Raskar
  Paul Beardsley
  Jeroen van Baar
  Yao Wang
  Paul Dietz
  Johnny Lee
  Darren Leigh
  Thomas Willwacher
  Mitsubishi Electric Research Laboratories
  raskar@merl.com

- VisualIDs: Automatic Distinctive Icons for Desktop Interfaces
  J.P. Lewis
  University of Southern California
  zilla@computer.org

  Ruth Rosenholtz
  Massachusetts Institute of Technology

  Nickson Fong
  ESC Entertainment

  Ulrich Neumann
  University of Southern California

- Motion Doodles: An Interface for Sketching Character Motion
  Matthew Thorne
  David Burke
  Michiel van de Panne
  The University of British Columbia

- MathPad^2: A System for the Creation and Exploration of Mathematical Sketches
  Joseph J. LaViola, Jr.
  Robert C. Zeleznik
  Brown University
  jjl@cs.brown.edu

Tuesday, 10 August

10:30 am - 12:15 pm
Petree Hall C

Smoke, Water, & Goop

Session Chair
Doug L. James
Carnegie Mellon University

- Target-Driven Smoke Animation Raanan Fattal
  Dani Lischinski
  The Hebrew University of Jerusalem
  raananf@cs.huji.ac.il

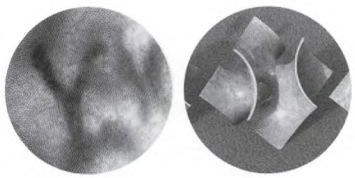
- Fluid Control Using the Adjoint Method
  Antoine McNamara
  Adrien Treuille
  Zoran Popović
  University of Washington
  antoine@cs.washington.edu

  Jos Stam
  Alias

- Simulating Water and Smoke with an Octree Data Structure
  Frank Losasso
  Frederic Gibou
  Stanford University
  losasso@graphics.stanford.edu

  Ronald Fedkiw
  Stanford University/Industrial Light + Magic

- A Method for Animating Viscoelastic Fluids
  Tolga G. Goktekin
  Adam W. Bargteil
  James F. O'Brien
  University of California, Berkeley
  goktekin@eecs.berkeley.edu



1:45 - 3:30 pm
West Hall A

Lighting & Sampling

Session Chair
Kavita Bala
Cornell University

- An Approximate Global Illumination System for Computer Generated Films
  Eric Tabellion
  Arnauld Lamorlette
  PDI/DreamWorks
  et@pdi.com

- Triple Product Wavelet Integrals for All-Frequency Relighting
  Ren Ng
  Stanford University
  renng@graphics.stanford.edu

  Ravi Ramamoorthi
  Columbia University

  Pat Hanrahan
  Stanford University

- Fast Hierarchical Importance Sampling With Blue Noise Properties
  Victor Ostromoukhov
  Charles Donohue
  Pierre-Marc Jodoin
  Université de Montréal
  ostrom@iro.umontreal.ca

- Efficient BRDF Importance Sampling Using A Factored Representation
  Jason Lawrence
  Szymon Rusinkiewicz
  Princeton University
  jlawrenc@cs.princeton.edu

  Ravi Ramamoorthi
  Columbia University

3:45 - 5:30 pm
Petree Hall C

Data-Driven Character Animation

Session Chair
Nancy Pollard
Carnegie Mellon University

- Speaking With Hands: Creating Animated Conversational Characters From Recordings of Human Performance
  Matthew Stone
  Doug DeCarlo
  Insuk Oh
  Christian Rodriguez
  Adrian Stere
  Rutgers University
  mdstone@cs.rutgers.edu

  Alyssa Whitlock Lees
  Christoph Bregler
  New York University

- Synthesizing Physically Realistic Human Motion in Low-Dimensional, Behavior-Specific Spaces
  Alla Safonova
  Jessica K. Hodgins
  Nancy S. Pollard
  Carnegie Mellon University
  alla@cs.cmu.edu

- Style-Based Inverse Kinematics
  Keith Grochow
  Steven L. Martin
  University of Washington
  keithg@cs.washington.edu

  Aaron Hertzmann
  University of Toronto

  Zoran Popović
  University of Washington

- Synthesizing Animations of Human Manipulation Tasks
  Katsu Yamane
  University of Tokyo
  yamane@ynl.t.u-tokyo.ac.jp

  James Kuffner
  Jessica K. Hodgins
  Carnegie Mellon University

Wednesday, 11 August

8:30 - 10:15 am
Petree Hall C

Shape & Motion

Session Chair
Leonard McMillan
University of North Carolina at Chapel Hill

- Pitching a Baseball: Tracking High-Speed Motion With Multi-Exposure Images
  Christian Theobalt
  Irene Albrecht
  Jörg Haber
  Marcus Magnor
  Hans-Peter Seidel
  Max-Planck-Institut für Informatik
  theobalt@mpi-sb.mpg.de

- Spacetime Faces: High-Resolution Capture for Modeling and Animation
  Li Zhang
  Keith Noah Snavely
  Brian Curless
  Steven M. Seitz
  University of Washington
  lizhang@cs.washington.edu

- Automated Extraction and Parameterization of Motions in Large Data Sets
  Lucas Kovar
  Michael Gleicher
  University of Wisconsin-Madison
  kovar@cs.wisc.edu

- Obscuring Length Changes During Animated Motion
  Jason Harrison
  Ronald A. Rensink
  Michiel van de Panne
  The University of British Columbia
  harrison@cs.ubc.ca

10:30 am - 12:15 pm
West Hall A

Video-Based Rendering

Session Chair
Irfan Essa
Georgia Institute of Technology

- Video Tooning
  Jue Wang
  University of Washington
  juew@u.washington.edu

  Yingqing Xu
  Heung-Yeung Shum
  Microsoft Research Asia

  Michael F. Cohen
  Microsoft Research

- Keyframe-Based Tracking for Rotoscoping and Animation
  Aseem Agarwala
  University of Washington
  aseem@cs.washington.edu

  Aaron Hertzmann
  University of Toronto

  David H. Salesin
  The University of Washington/ Microsoft Research

  Steven M. Seitz
  University of Washington

- Video Matching
  Peter Sand
  Seth Teller
  Massachusetts Institute of Technology
  sand@mit.edu

- High-Quality Video View Interpolation Using a Layered Representation
  Charles Lawrence Zitnick
  Sing Bing Kang
  Matt Uyttendaele
  Simon Winder
  Richard Szeliski
  Microsoft Research
  larryz@microsoft.com

10:30 am - 12:15 pm
Petree Hall C

Shape Analysis

Session Chair
Nina Amenta
University of California, Davis

- Ridge-Valley Lines on Meshes via Implicit Surface Fitting
  Yutaka Ohtake
  Alexander Belyaev
  Hans-Peter Seidel
  Max-Planck-Institut für Informatik
  ohtake@mpi-sb.mpg.de

- Fair Morse Functions for Extracting the Topological Structure of a Surface Mesh
  Xinlai Ni
  Michael Garland
  John C. Hart
  University of Illinois at Urbana-Champaign
  xinlaini@uiuc.edu

- Shape Matching and Anisotropy
  Michael Kazhdan
  Thomas Funkhouser
  Szymon Rusinkiewicz
  Princeton University
  mkazhdan@cs.princeton.edu

1:45 - 3:30 pm
West Hall A

Interactive Modeling

Session Chair
Mark Pauly
Stanford University

- An Intuitive Framework for Real-Time Freeform Modeling
  Mario Botsch
  Leif P. Kobbelt
  RWTH Aachen
  botsch@cs.rwth-aachen.de

- Interactive Modeling of Topologically Complex Geometric Detail
  Jianbo Peng
  Daniel Kristjansson
  Denis Zorin
  New York University
  jianbo@mrl.nyu.edu

- Mesh Editing With Poisson-Based Gradient Field Manipulation
  Yizhou Yu
  University of Illinois at Urbana-Champaign
  yyz@cs.uiuc.edu

  Kun Zhou
  Microsoft Research Asia

  Dong Xu
  Xiaohan Shi
  Microsoft Research Asia/Zhejiang University

  Hujun Bao
  Zhejiang University

  Baining Guo
  Heung-Yeung Shum
  Microsoft Research Asia

- Modeling by Example
  Thomas Funkhouser
  Michael Kazhdan
  Philip Shilane
  Princeton University
  funk@cs.princeton.edu

  Patrick Min
  Universiteit Utrecht

  William Kiefer
  Princeton University

  Ayellet Tal
  Technion - Israel Institute of Technology

  Szymon Rusinkiewicz
  David Dobkin
  Princeton University

Wednesday, 11 August

3:45 - 5:30 pm
West Hall A

Flash & Color

Session Chair
Richard Szeliski
Microsoft Research

- Digital Photography With Flash and No-Flash Image Pairs
  Georg Petschnigg
  Maneesh Agrawala
  Hugues Hoppe
  Richard Szeliski
  Michael F. Cohen
  Kentaro Toyama
  Microsoft Research
  georgp@microsoft.com

- Flash Photography Enhancement Via Intrinsic Relighting
  Elmar Eisemann Artis
  Frédo Durand
  Massachusetts Institute of Technology
  eisemann@graphics.lcs.mit.edu

- Non-Photorealistic Camera: Depth Edge Detection and Stylized Rendering Using Multi-Flash Imaging
  Ramesh Raskar
  Kar-han Tan
  Mitsubishi Electric Research Laboratories
  raskar@merl.com

  Rogerio Feris
  University of California, Santa Barbara

  Jingyi Yu
  Massachusetts Institute of Technology

  Matthew Turk
  University of California, Santa Barbara

- Colorization Using Optimization
  Anat Levin
  Dani Lischinski
  Yair Weiss
  The Hebrew University of Jerusalem
  alevin@cs.huji.ac.il

Thursday, 12 August

8:30 - 10:15 am
West Hall A

Capture From Images

Session Chair
Markus Gross
Eidgenössische Technische Hochschule Zürich

- Protected Interactive 3D Graphics Via Remote Rendering
  David Koller
  Michael Turitzin
  Marc Levoy
  Stanford University
  dk@cs.stanford.edu

  Marco Tarini
  Giuseppe Croccia
  Paolo Cignoni
  Roberto Scopigno
  Istituto di Scienza e Technologie dell'Informazione

- Eyes for Relighting
  Ko Nishino
  Shree K. Nayar
  Columbia University
  kon@cs.columbia.edu

- Capture of Hair Geometry From Multiple Images
  Sylvain Paris
  Hector M. Briceño
  François X. Sillion
  ARTIS GRAVIR/IMAG, INRIA
  Sylvain.Paris@imag.fr

- Volumetric Reconstruction and Interactive Rendering of Trees from Photographs
  Alex Reche
  REVES/INRIA and CSTB
  Alex.Reche@sophia.inria.fr

  Ignacio Martin
  GGG/Universitat de Girona

  George Drettakis
  REVES/INRIA

8:30 - 10:15 am
West Hall B

Reprise of UIST and VRST

The User-Interface Software and Technology (UIST) Symposium and the Symposium on Virtual Reality Software and Technology (VRST) are two small conferences sponsored by ACM SIGGRAPH. In this session, five of the best papers from the most recent UIST and VRST symposia are presented in abbreviated form.

UIST

- Perceptually-Supported Image Editing of Text and Graphics
  Eric Saund
  David Fleet
  Daniel Larner
  James Mahoney
  Palo Alto Research Center
  saund@parc.com

- VisionWand: Interaction Techniques for Large Displays Using a Passive Wand Tracked in 3D
  Xiang Cao
  Ravin Balakrishnan
  University of Toronto
  caox@cs.toronto.edu

- GADGET: A Toolkit for Optimization-Based Approaches to Interface and Display Generation
  James Fogarty
  Scott E. Hudson
  Carnegie Mellon University
  jfogarty@cs.cmu.edu

VRST

- The CAT for Efficient 2D and 3D Interaction as an Alternative to Mouse Adaptations
  Martin Hachet
  Pascal Guitton
  Patrick Reuter
  Florence Tyndiuk
  LaBRI, INRIA
  hachet@labri.fr

- Super Wide Viewer Using Catadioptrical Optics
  Hajime Nagahara
  Yasushi Yagi
  Masahiko Yachida
  Osaka University
  nagahara@sys.es.osaka-u.ac.jp

Thursday, 12 August

10:30 am - 12:15 pm
West Hall A

HDR and Perception

Session Chair
Jack Tumblin
Northwestern University

- Perception-Motivated High-Dynamic-Range Video Encoding
  Rafal Mantiuk
  Grzegorz Krawczyk
  Karol Myszkowski
  Hans-Peter Seidel
  Max-Planck-Institut für Informatik
  mantiuk@mpi-sb.mpg.de

- Perceptual Illumination Components: A New Approach to Efficient, High-Quality Global Illumination Rendering
  William A. Stokes
  James A. Ferwerda
  Bruce Walter
  Donald P. Greenberg
  Cornell University
  wuz@graphics.cornell.edu

- Supra-Threshold Control of Peripheral LOD
  Benjamin Watson
  Northwestern University
  watson@northwestern.edu

  Neff Walker
  UNAIDS

  Larry F. Hodges
  University of North Carolina at Charlotte

- High-Dynamic-Range Display Systems
  Helge Seetzen
  Sunnybrook Technologies/The University of British Columbia
  helge.seetzen@sunnybrooktech.com

  Wolfgang Heidrich
  The University of British Columbia

  Wolfgang Stuerzlinger
  York University

  Gregory Ward
  Sunnybrook Technologies

  Lorne Whitehead
  Matthew Trentacoste
  Abhijeet Ghosh
  The University of British Columbia

  Andrejs Vorozcovs
  York University

10:30 am - 12:15 pm
Petree Hall C

Large Meshes and GPU Programming

Session Chair
Peter-Pike Sloan
Microsoft Corporation

- Geometry Clipmaps: Terrain Rendering Using Nested Regular Grids
  Frank Losasso
  Stanford University
  losasso@graphics.stanford.edu

  Hugues Hoppe
  Microsoft Research

- Brook for GPUs: Stream Computing on Graphics Hardware
  Ian Buck
  Tim Foley
  Daniel Horn
  Jeremy Sugerman
  Kayvon Fatahalian
  Mike Houston
  Pat Hanrahan
  Stanford University
  ianbuck@graphics.stanford.edu

- Shader Algebra
  Michael McCool
  Stefanus Du Toit
  Tiberiu Popa
  Bryan Chan
  Kevin Moule
  University of Waterloo
  mmccool@uwaterloo.ca

- Adaptive TetraPuzzles: Efficient Out-of-Core Construction and Visualization of Gigantic Multiresolution Polygonal Models
  Paolo Cignoni
  Fabio Ganovelli
  Istituto di Scienza e Tecnologie dell'Informazione
  cignoni@isti.cnr.it

  Enrico Gobbetti
  Center for Advanced Studies, Research and Development in Sardinia

  Fabio Marton
  Center for Advanced Studies, Research and Development in Sardinia

  Federico Ponchio
  Roberto Scopigno
  Istituto di Scienza e Tecnologie dell'Informazione

1:45 - 3:30 pm
West Hall A

Lightfield Acquisition & Display

Session Chair
Hanspeter Pfister
Mitsubishi Electric Research Laboratories

- A Stereo Display Prototype With Multiple Focal Distances
  Kurt Akeley
  Stanford University
  kurt@akeleyfamily.com

  Simon J. Watt
  Ahna Reza Girshick
  Martin S. Banks
  University of California, Berkeley

- 3D TV: A Scalable System for Real-Time Acquisition, Transmission, and Autostereoscopic Display of Dynamic Scenes
  Wojciech Matusik
  Hanspeter Pfister
  Mistubishi Electric Research Laboratories
  wojciech@graphics.lcs.mit.edu

- Synthetic Aperture Confocal Imaging
  Marc Levoy
  Billy Chen
  Vaibhav Vaish
  Mark Horowitz
  Stanford University
  levoy@cs.stanford.edu

  Ian McDowall
  Mark Bolas
  Fakespace Labs

- DISCO - Acquisition of Translucent Objects
  Michael Goesele
  Hendrik P. A. Lensch
  Jochen Lang
  Christian Fuchs
  Hans-Peter Seidel
  Max-Planck-Institut für Informatik
  goesele@mpi-sb.mpg.de

1:45 - 3:30 pm
West Hall B

Mesh Parameterization

Session Chair
Michael Garland
University of Illinois at Urbana-Champaign

- Painting Detail
  Nathan A. Carr
  John C. Hart
  University of Illinois at Urbana Champaign
  nacarr@uiuc.edu

- Polycube-Maps
  Marco Tarini
  Kai Hormann
  Paolo Cignoni
  Claudio Montani
  Istituto di Scienza e Technologie dell'Informazione
  tarini@isti.cnr.it

- Cross-Parameterization and Compatible Remeshing of 3D Models
  Vladislav Kraevoy
  Alla Sheffer
  The University of British Columbia
  vlady@cs.ubc.ca

- Inter-Surface Mapping
  John Schreiner
  Arul Asirvatham
  Emil Praun
  University of Utah
  jmschrei@cs.utah.edu

  Hugues Hoppe
  Microsoft Research

Thursday, 12 August

3:45 - 5:30 pm
West Hall A

Fixing Models

Session Chair
Emil Praun
University of Utah

- Context-Based Surface Completion
  Andrei Sharf
  Tel Aviv University
  asotzio@post.tau.ac.il

  Marc Alexa
  Technische Universität Darmstadt

  Daniel Cohen-Or
  Tel Aviv University

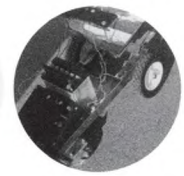
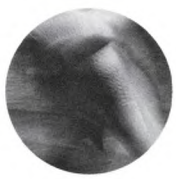
- Robust Repair of Polygonal Models
  Tao Ju
  Rice University
  jutao@cs.rice.edu

- Interpolating and Approximating Implicit Surfaces From Polygon Soup
  Chen Shen
  James F. O'Brien
  Jonathan R. Shewchuk
  University of California, Berkeley
  csh@eecs.berkeley.edu

- Variational Shape Approximation
  David Cohen-Steiner
  Duke University
  david@cs.duke.edu

  Pierre Alliez
  INRIA

  Mathieu Desbrun
  University of Southern California


Panels

Debate, argument, and discussion on important topics in computer graphics and interactive techniques, and related fields. Experts and skeptics deliver opinions, insights, speculation, and summaries of recent work. The audience follows up with questions, comments, and criticism. The result: new perspectives on key questions and current controversies.

Panels Committee

Jonathan Gibbs
SIGGRAPH 2004 Panels Chair
PDI/DreamWorks

Andrew Chapman
Framestore CFC

Dena Eber
Bowling Green State University

Rachel Falk
PDI/DreamWorks

Ronald Fedkiw
Stanford University

Leo Hourvitz
Maxis/EA

Jeff Jortner
Sandia National Laboratories

Christian Lavoie
Sony Computer Entertainment Europe

James F. O'Brien
University of California, Berkeley

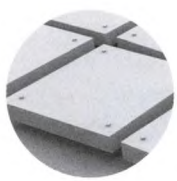
Garry Paxinos
US Digital Television

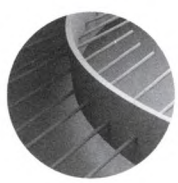
Matt Pharr
NVIDIA Corporation

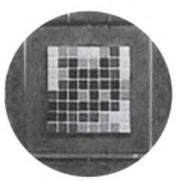
Holly Rushmeier
Yale University

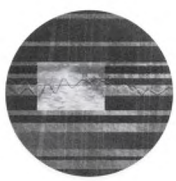
Francis Schmidt
Bergen Community College

Jill Smolin
SIGGRAPH 2005 Panels Chair
The Gnomon Workshop









Monday, 9 August

10:30 am - 12:15 pm
Room 511AB

Building a Bridge to the Aesthetic Experience: Artistic Virtual Environments and Other Interactive Digital Art

Most artists, curators, and museum educators share an important common goal: to create or curate art that viewers can appreciate and enjoy. Ideally, they also want viewers to enter an experience that is immersive and builds a connection with the work beyond the surface of the media. This aesthetic experience is complex and multifaceted, and may be characterized by a finely tuned state of consciousness, or awe, intense focus, and pure enjoyment (Dewey, 1934; Csikszentmihalyi & Robinson, 1990a). Csikszentmihalyi also refers to this state as the flow experience (Csikszentmihalyi, 1990b).

Many people feel that virtual environments or other digital technologies may facilitate the aesthetic experience for the viewer. Others feel that this equipment does nothing to bring participants closer to a flow experience, and that the complexity, expense, and inaccessibility of this genre of art installations may confuse and alienate viewers.

This panel is not about the validity of virtual environments and interactive digital works as art forms. It is a debate on the effectiveness of this technology to help the viewer experience art in a richer way. Panelists discuss theory, experiences of individual artists, and studies that connect the quality of the aesthetic experience to digital interactivity.

Moderator
Dena Eber
Bowling Green State University

Panelists
Brian Betz
Kent State University

Tobey Crockett
University of California, Irvine

Flavia Sparacino
Sensing Places/Massachusetts Institute of Technology

3:45 - 5:30 pm
Petree Hall C

Careers in Computer Graphics Entertainment

A forum for information exchange between people who are interested in the field and the organizations they might work for. Panelists from large, mid-sized, and small companies spanning digital features, games, visual effects, commercials, and more discuss today's job market and how to best prepare for entry into the industry.

Topics include: skills required for production, production support, entry-level positions, internships, reel and résumé preparation, how to apply for work, and typical job shortages and surpluses. If you're a student, an educator, or just plain curious, this panel delivers inside information.

Moderator
Rachel Falk
PDI/DreamWorks

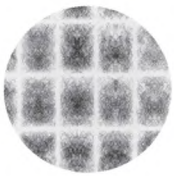
Panelists
Hael Kobayashi
Animal Logic

Bob Nicoll
Electronic Arts

Luke O'Byrne
The Orphanage

Dan Scherlis
Etherplay

Kate Shaw
Industrial Light + Magic



Tuesday, 10 August

10:30 am - 12:15 pm
Room 511AB

3D Animation: Difficult or Impossible to Teach and Learn?

Teaching the skills needed to animate in current 3D software is difficult. Learning it may be more so. Being the only totally digital art form, it does not fall neatly into computer science or art. It does share an abundance of the complexities and consternations of both. Current applications can feel like a hodge-podge of ideas from drafting, particle and Newtonian physics, geometry, and puppet animation, forcing the student to face the most complex interface in computerdom. The programs get harder to learn as you read this.

This panel is for anyone who has ever been frustrated by 3D software, which probably includes just about anybody who has ever tried one of these programs.The panelists attempt to determine the nature of current educational practice in 3D animation. They examine the situation from three viewpoints (user, creator, and educator) and search for a consensus on what works and what doesn't. Multiple insights will help us understand where we are in the evolution of 3D education and what directions to explore in the future.

Particular emphasis is placed on the existing model: coursework, demo projects, internships, employment, and continuing development of software. What are the negative and positive aspects of this situation? How does this compare to other areas (film and video, photography) of digital imagery training? Who is getting what they need out of the situation? Should education be application-specific? Should it be delivered in a trade school or a liberal arts college?

Panelists were selected for their positions in the infrastructure of 3D training: educator, employer, or software author. This may be the first time representatives from all these groups have gathered to discuss how people learn to produce the virtual worlds they create.

Moderator
Francis Schmidt
Bergen Community College

Panelists
Jim Jagger
BioWare Corp.

Jim McCampbell
Ringling School of Art and Design

Craig Slagel
Electronic Arts

1:45 - 3:30 pm
Room 501AB

Next-Generation User Interface Technology for Consumer Electronics

As the power and complexity of consumer electronic devices continues to increase, the potential for a more enthralling, visually exciting, and compelling user experience also increases. The purpose of this panel is to investigate application of existing tools and techniques from various disciplines within the ACM SIGGRAPH community to the next generation of consumer devices.

Given the power of the CPUs and graphics engines being designed into the next generation of devices, is it possible, meaningful, useful, and/or appropriate to exploit such technologies as:

- OpenGL/DirectX
- Game engines
- Parallel processing
- Haptic devices
- Augmented reality
- Story-telling interactivity
- Scientific visualization
- Animation

As we prepare to step into a new world of human interaction with electronics devices in our daily lives, we must find new ways to create an effective and enjoyable user experience. The ACM SIGGRAPH community is uniquely positioned to influence the interaction between consumers and their home environments.

Moderator
Garry Paxinos
US Digital Television

Panelists
John Card II
EchoStar Technologies Corp.

Evan Hirsch

Rebecca R. Lim
Starz Encore Group

Glen Stone
Sony Business Solutions & Systems

3:45 - 5:30 pm
Room 502A

Cultural Heritage and Computer Graphics: What Are the Issues?

In many parts of the world, governments are allocating more financial support for projects that use technology to preserve and communicate cultural heritage. This panel considers several key related questions: What is the role of computer graphics in these projects? Is cultural heritage just an interesting area for using graphics, or does it present unique research challenges? How successful have projects in computer graphics and cultural heritage been? Are the basic tools and techniques developed in graphics adequate for use in cultural heritage, or are we missing opportunities?

This panel brings together the growing population of people who work in the area of computer graphics and cultural heritage. People who have worked on these projects report on their experiences (what has worked and what has not) and explore unsolved problems. The goal is to determine what we need to move past the current "yet-another-project" phase and build a formal body of knowledge in computer graphics and cultural heritage.

Moderator
Holly Rushmeier
Yale University

Panelists
David Arnold
University of Brighton

Alan Chalmers
University of Bristol

Katsushi Ikeuchi
The University of Tokyo

Mark Mudge
Cultural Heritage Imaging

Roberto Scopigno
Istituto Scienza e Tecnologie dell'Informazione

Wednesday, 11 August

1:45 - 3:30 pm
Petree Hall C

Custom Software Development in Post-Production

Most post-production and digital effects work employs custom software to varying degrees. This software may be necessary for high-end work, and it produces stunning results, but from the perspective of digital artists and other users it is often fragile and difficult to use.

This panel discusses in broad terms what is wrong with our custom software, why it is this way, and how it can be improved. Also a major topic: whether open-source software can be utilized to improve the situation.

Moderator
Andrew Chapman
Framestore CFC

Panelists
Jack Brooks
Walt Disney Imagineering

David Hart
PDI/DreamWorks

Daniel Maskit
Digital Domain

Steve Sullivan
Industrial Light + Magic

Thursday, 12 August

1:45 - 3:30 pm
Petree Hall C

Games Development: How Will You Feed the Next Generation of Hardware?

Every time a new high-end platform is released, development techniques become more complex. In the early 1980s, a videogame was a six-to-nine-month job for a single person. A typical team size these days is 25-30, and it's not uncommon to see games taking two or three years (or more) to complete. We see an increase in complexity with every new high-end platform, both in terms of development techniques and quantity of art assets. On average, each new console is 10 times more powerful than its predecessor and tends to require double the team size to produce games for the new environment. As development teams once again see new hardware fast approaching on the horizon, the question arises: How we will manage the increase in content creation?

Companies will not be able to expand their teams into the hundreds, take three years to put out a title, and then pray that it sells enough to support all those people and salaries. Simply bloating the old production model will not work. It's time for new solutions. With that in mind, the main thrust of this panel discussion is to explore how we can approach the challenge of making the games that the next generation of hardware will demand. The possible solutions are many, but are there any that will really allow teams to output both quantity and quality while still maintaining financial viability and manageable staff numbers?

Moderator
Christian Lavoie
Sony Computer Entertainment Europe

Panelists
Emilie Saulnier
Vicarious Visions

James Spoto
Frank Vitz
Electronic Arts

Sketches

Short talks followed by question-and-answer exchanges on a broad spectrum of topics in art, design, science, and engineering. Sketches emphasize novel and interdisciplinary applications of computer graphics and interactive techniques, including provocative speculation, academic research, industrial development, practical tools, and behind-the-scenes explanations of commercial and artistic works.

Sketches Committee

Ronen Barzel
SIGGRAPH 2004 Sketches Chair
Pixar Animation Studios

Ed Angel
University of New Mexico

Joanna Berzowska
XS Labs

Juan Buhler
SIGGRAPH 2005 Sketches Chair
PDI/DreamWorks

Neill Campbell
University of Bristol

Raquel Coelho
Tippett Studio

Carolina Cruz-Neira
Iowa State University

Cassidy Curtis
PDI/DreamWorks

Cindy Grimm
Washington University in St. Louis

André Gueziec
Triangle Software LLC

Baining Guo
Microsoft Research Asia

Eric Haines
Autodesk, Inc.

Darren Hendler
Digital Domain

Leo Hourvitz
Maxis/EA

Ming Lin
University of North Carolina at Chapel Hill

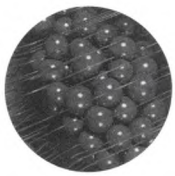
Maureen Nappi
New York University

Mary Phillipuk
Core 77

Guido Quaroni
Pixar Animation Studios

Mel Slater
University College London



Sunday, 8 August

8:30 - 10:15 am
Room 511AB

Session Chair
Cassidy Curtis, PDI/DreamWorks

Artistic Depiction

Mosaic for Stackable Objects

An algorithm for layered photomosaics with stackable and rotatable objects expresses a mosaic of a pile of stackable objects and creates a very powerful artistic experience.

Jin Wan Park
Chung-Ang University
jinpark@cau.ac.kr

Strokes for Drawings Using Illuminated Paper Surfaces

A simple method for generating "realistic" strokes for drawing tools such as pastels, chalks, charcoals, or crayons that are highly affected by the support medium, in real time.

Kyoko Murakami
Kyushu Institute of Design
kyoko@verygood.aid.design.kyushu-u.ac.jp

Reiji Tsuruno
Etsuo Genda
Kyushu University

A Viscous Paint Model for Interactive Applications

A viscous fluid model for use in an interactive painting system based on the Stokes equations renders paint using a novel graphics hardware-based Kubelka-Munk shader.

William V. Baxter
University of North Carolina at Chapel Hill
baxter@cs.unc.edu

Ming C. Lin
Yuanxin Liu
University of North Carolina at Chapel Hill

Automatic Image Retargeting

A non-photorealistic algorithm for automatically retargeting images: adapting them for display at different sizes and/or aspect ratios, while preserving their important features and qualities.

Vidya Setlur
Northwestern University
vidya@cs.northwestern.edu

Saeko Takagi
Wakayama University

Michael Gleicher
University of Wisconsin

Ramesh Raskar
Mitsubishi Electric Research Laboratories

Bruce Gooch
Northwestern University

10:30 am - 12:15 pm
Room 511AB

Session Chair
Cassidy Curtis, PDI/DreamWorks

Sketchy Sketches

Tweaking Stylized Light and Shade

Interactive techniques for creating fake, stylized highlights and shaded areas simply by drag operations on an on-screen surface, without laborious parameter tuning.

Ken Anjyo
OLM Digital, Inc.
anjyo@olm.co.jp

Shuhei Wemler
Silicon Studio Corporation

Sketch Interface for 3D Modeling of Flowers

A user interface that easily models flowers from freehand sketches. Using this interface, the user can create a plant model by only drawing simple strokes.

Takashi Ijiri
The University of Tokyo
takashi@tranzas.ne.jp

Takeo Igarashi
The University of Tokyo/Japan Science and Technology Corporation

Etsuya Shibayama
Shin Takahashi
Tokyo Institute of Technology

SketchPose: Artist-Friendly Posing Tool

A new tool that allows animators to position sets of controls with mouse strokes, providing an interface for posing complex rig setups in an intuitive way.

Mark Swain
Walt Disney Feature Animation
mark.swain@disney.com

Brendan Duncan
Walt Disney Feature Animation

Making the Leap: Cross-Training 2D Artists Into 3D

How do you cross-train a traditional 2D animation house not only how to use 3D tools but also to embrace the aesthetic? Here's how we did it.

Matt Elson
Walt Disney Feature Animation
matt.elson@disney.com

Walt Sturrock
Walt Disney Feature Animation

Monday, 9 August

8:30 - 10:15 am
Room 511AB

Session Chair
André Gueziec, Triangle Software LLC

Terrain & Maps

Inter-Frame Caching for High-Quality Terrain Rendering

Overview of how real-time terrain rendering methods were used to optimize render times in a photorealistic terrain rendering system used for visual effects in feature films.

Märten Larsson
Digital Domain/Linköpings universitet
marten@martenlarsson.com

Doug Roble
Digital Domain

Magnus Wrenninge
Digital Domain

Robust Rendering of High-Resolution Terrain

Presentation of a robust terrain and planet renderer that has been used successfully in feature-film production, with efficient motion blur, high-resolution displacement, and a modular shading architecture.

Matt Fairclough
Planetside Software
matt@planetside.co.uk

Märten Larsson
Digital Domain/Linköpings universitet

Magnus Wrenninge
Digital Domain

A Software for Reconstructing 3D Terrains From Scanned Maps

Process methodology and algorithms used in a free specialized software for creating digital elevation models from scanned color maps using different techniques.

Joachim Pouderoux
IPARLA Project (LaBRI - INRIA)
Joachim.Pouderoux@LaBRI.fr

Jean-Christophe Gonzato
Xavier Granier
Pascal Guitton
IPARLA Project (LaBRI - INRIA)

Visual Simulation of the Interaction Between Market Demand, Planning Rules, and City Form

A novel method for rapidly generating large 3D urban environments. This technique parametrically allocates and styles buildings in appropriate patterns but requires only general zoning and physical maps.

Michael Flaxman
Ritsumeikan University

Yusuru Isoda
Keiji Yano
Ritsumeikan University

3:45 - 5:30 pm
Room 502A

Session Chair
André Gueziec, Triangle Software LLC

I've Seen Fire and I've Seen Rain

A Physically Based Model of Ice

Freezing animations are becoming popular, making appearances in "X-Men 2" and "The Hulk." However, modeling methods for freezing remain ad-hoc. This sketch presents a physical model for ice.

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

Michael Henson
Ming C. Lin
University of North Carolina at Chapel Hill

Rendering Falling Rain and Snow

A novel technique for realistically and efficiently rendering precipitation with moving cameras. The technique maps textures onto a double cone and translates and elongates them using hardware texture transforms.

Niniane Wang
Google Inc.
niniane@ofb.net

Bretton Wade
Microsoft Corporation

Stormy Weather

Development of a system for simulating and rendering photorealistic stormy skies with roiling clouds, lightning, and rain for "Van Helsing."

Willi Geiger
Industrial Light + Magic
wgeiger@ilm.com

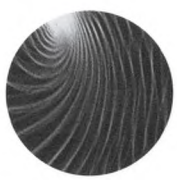
Simon Eves
Robert Hoffmeister
Masi Oka
Industrial Light + Magic

Image-Based Tomographic Reconstruction of Flames

A method for volumetric modeling and rendering of flames based on visual hull restricted computerized tomography on real-world multi-video sequences.

Ivo Ihrke
Max-Planck-Institut für Informatik
ihrke@mpi-sb.mpg.de

Marcus Magnor
Max-Planck-Institut für Informatik



Tuesday, 10 August

8:30 - 10:15 am
Room 501AB

Session Chair
Mary Phillipuk, Core 77

Design and Visual Communication

Controsenso But Not So Much: Digital Artifacts to Ease Communication and Exchange With Seeing-Impaired People

Genoa as you have never seen it. A tour guided by seeing-impaired people to reveal the poetry in city life. Interactive story telling driven by sound and images.

Andrea Brogi
Università degli Studi di Milano
andrea.brogi@unimi.it

Maria Alberta Alberti
Paola Trapani
Università degli Studi di Milano

Luca Dusio
Manuela Garcia
Politecnico di Milano

Stephan Knobloch
Köln International School of Design

Ecce Homology

This physically interactive new-media work visualizes genetic data as calligraphic forms. A computer-vision-based UI allows participants to select genes for visualizing BLAST, an algorithm in comparative genomics.

Ruth West
University of California, San Diego
Center for Research in Computing and The Arts University of California, Los Angeles Design/Media Arts
sig04@viewingspace.com

Jeff Burke
Ethan Drucker
Thomas Holton
Cheryl Kerfeld
Eitan Mendelowitz
Weihong Yan
University of California, Los Angeles

Artifacts of the Presence Era: Visualizing Presence for Posterity

An art installation that uses a geological metaphor to create an impressionistic visualization of the evolving history in a museum's gallery.

Judith Donath
Massachusetts Institute of Technology
Media Lab
judith@media.mit.edu

Fernanda B. Viégas
Ethan Howe
Ethan Perry
Massachusetts Institute of Technology
Media Lab

Symbol Mall

A multimedia application that explores new-media theory, narrative, and aesthetics in digital culture. It uses low-level navigation to promote a basic cognitive means of interaction.

Daryl H. Hepting
University of Regina
hepting@cs.uregina.ca

Sheila Petty
Jirayu Uttaranakorn
University of Regina

8:30 - 10:15 am
Room 502A

Session Chair
Eric Haines, Autodesk, Inc.

GPU1

Faster GPU Computations Using Adaptive Refinement

A technique for improving the speed of multi-pass GPU computations by using adaptive refinement.

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

Henrik Wann Jensen
University of California, San Diego

Quick-VDR: Interactive View-Dependent Rendering of Massive Models

A novel approach for interactive view-dependent rendering of massive models and demonstration of interactive results (10-35 fps) on a 100M-triangle isosurface and a 372M-triangle scanned model.

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

Russell Gayle
Dinesh Manocha
Brian Salomon
University of North Carolina at Chapel Hill

Fast and Reliable Collision Culling Using Graphics Hardware

A fast and reliable collision culling algorithm on graphics processors for handling complex objects with tens of thousands of polygons, including objects undergoing deformation and non-rigid motion.

Naga K. Govindaraju
University of North Carolina at Chapel Hill
naga@cs.unc.edu

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

UberFlow: A GPU-Based Particle Engine

A particle engine on GPU for real-time animation of large particle sets using OpenGL memory objects to create, manipulate, and render geometry without read-back, including inter-particle collision and visibility sorting.

Peter Kipfer
Technische Universität München
kipfer@in.tum.de

Mark Segal
ATI Research

Rüdiger Westermann
Technische Universität München

Tuesday, 10 August

8:30 - 10:15 am
Room 511AB

Session Chair
Mel Slater, University College London

Applications

Abstract Virtual Environments for Assessing Cognitive Abilities

Design and pilot testing of abstract virtual environments for evaluating decision-making in neurologically impaired subjects. Preliminary results are promising, suggesting further exploration of VEs for assessing cognitive abilities.

Joan Severson
Digital Artefacts
joan@digitalartefacts.com

Matthew Rizzo
University of Iowa

Interactive American Sign Language Dictionary

A PC-based American Sign Language-to-English dictionary that interacts with the user by means of a gestural interface: an AcceleGlove and a two-link arm skeleton.

Jose L. Hernandez-Rebollar
The George Washington University
jreboll@gwu.edu

Erik Mendez
The George Washington University

Interactive Visualization of Exceptionally Complex Industrial CAD Datasets

Interactively visualizing extremely large datasets using ray tracing. As a demonstration, a 350-million-triangle Boeing 777 model is rendered at several frames per second.

Andreas Dietrich
Universität des Saarlandes
dietrich@graphics.cs.uni-sb.de

Philipp Slusallek
Universität des Saarlandes

Ingo Wald
Max-Planck-Institut für Informatik

Computer-Linked Autofabricated 3D Models for Teaching Structural Biology

An AR system that allows virtual 3D molecular computational models to be overlaid onto tangible representations of molecules to enhance their semantic content and show dynamic properties.

Arthur Olson
The Scripps Research Institute
olson@scripps.edu

Alexandre Gillet
David Goodsell
Michel Sanner
Daniel Stoffler
The Scripps Research Institute

Suzanne Weghorst
William Winn
University of Washington

8:30 - 10:15 am
Petree Hall C

Session Chair
Ronen Barzel, Pixar Animation Studios

Motion

Skeletal Parameter Estimation From Optical Motion Capture Data

A method for automatically estimating skeleton parameters from optical motion capture data. The method identifies rigid bodies and their connectivity, and estimates relative joint location.

Adam Kirk
University of California, Berkeley
akirk@cs.berkeley.edu

James F. O'Brien
David A. Forsyth
University of California, Berkeley

Interactive Motion Decomposition

A visual method of decomposing motion into components. These components can be used to alter a second motion so that it exhibits the style of the decomposed motion.

Ari Shapiro
University of California, Los Angeles
ashapiro@cs.ucla.edu

Yong Cao
Petros Faloutsos
University of California, Los Angeles

Marker-Less Human Motion Transfer

A marker-less system for transferring human motions: given videos of two people performing different motions, the system generates videos of each person performing the motion of the other person.

Kong (German) Cheung
Carnegie Mellon University
german@ux2.sp.cs.cmu.edu

Simon Baker
Jessica Hodgins
Takeo Kanade
Carnegie Mellon University

Motion Emphasis Filter for Making Mental Motion of 3D Characters

A "motion emphasis filter" for making mental motion of 3D characters in computer animation. Mental motion is an exaggerated motion that humans sense as the real motion.

Koie Yoshiyuki
Saitama University
koie@ke.ics.saitama-u.ac.jp

Toshihiro Komma
Shobi University

Kondo Kunio
Saitama University

Tuesday, 10 August

10:30 am - 12:15 pm
Room 501AB

Session Chair
Mary Phillipuk, Core 77

Tangible/Ambient Media

Cafe Tools: Contents that Connect People

A chair and a lamp present a new style for real communication by adding another communication channel in a future public communication space.

Atsuro Ueki
Keio University
atsurou@activemail.jp

Masa Inakage
Keio University

Very Slowly Animating Textiles: Shimmering Flower

A simple technology for non-emissive, color-change textiles. It functions as a woven animated display, constructed with conductive yarns and thermochromic inks together with custom electronics components.

Joanna Berzowska
XS Labs
joey@berzowska.com

Arkadiusz Banasik
XS Labs

Scents of Space: An Interactive Smell System

An interactive smell system that allows for three-dimensional placement of fragrances without dispersion, enabling the creation of dynamic olfactory zones and boundaries.

Usman Haque
Haque Design and Research
info@haque.co.uk

Josephine Pletts
Luca Turin
Flexitral

A Malleable Surface Touch Interface

This touch interface that captures whole-hand input through a malleable surface medium can be used to perform operations involving deformations that would otherwise be difficult with hard surfaces.

Timothy Chen
The University of British Columbia
tichen+sig2k4@ece.ubc.ca

Sidney Fels
Reynald Hoskinson
Florian Vogt
The University of British Columbia

10:30 am - 12:15 pm
Room 502A

Session Chair
Cindy Grimm, Washington University

Squash, Stretch, and Repeat

Geometry Synthesis

A method for geometry synthesis inspired by texture-synthesis techniques. Given an example of input geometry, the technique synthesizes new geometry that is perceived similar to the input geometry.

Ares Lagae
Katholieke Universiteit Leuven
ares.lagae@cs.kuleuven.ac.be

Olivier Dumont
Philip Dutré
Katholieke Universiteit Leuven

Squashing Cubes: Automating Deformable Model Construction for Graphics

An approach for automatically constructing deformable objects from arbitrary graphical models by voxelizing geometry into numerous elastic cubes.

Jernej Barbic
Carnegie Mellon University
barbic@cs.cmu.edu

Doug L. James
Christopher Twigg
Carnegie Mellon University

Shape-Preserving Mesh Deformation

A new approach for mesh deformation. Given a small number of control vertices, new mesh vertex positions are computed such that source shape parameters are preserved.

Vladislav Krayevoy
The University of British Columbia
vlady@cs.ubc.ca

Alla Sheffer
The University of British Columbia

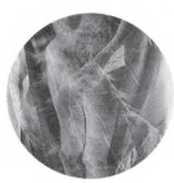
Swirling-Sweepers: Constant-Volume Modeling

Swirling-sweepers is a new method for modeling shapes while preserving volume. The artist describes a deformation by dragging a point. This technique does not require any volume computation.

Alexis Angelidis
University of Otago
alexis@cs.otago.ac.nz

Scott King
Geoff Wyvill
University of Otago

Marie-Paule Cani
Laboratoire GRAVIR



Tuesday, 10 August

1:45 - 3:30 pm
Room 502A

Session Chair
Ming C. Lin, University of North Carolina at Chapel Hill

Hair

Animating Puss in Boots' Feather in "Shrek2"

In "Shrek2," Puss in Boots' animated ostrich feather is accomplished by combining a course simulation of an underlying surface with detailed procedural animation on the barbs on the feather.

Scott Peterson
PDI/DreamWorks
peterson@pdi.com

Simulating and Rendering Wet Hair

Techniques to simulate and render wet hair for modeling virtual humans.

Kelly Ward
University of North Carolina at Chapel Hill
wardk@cs.unc.edu

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

Quick Image-Based Lighting of Hair

A fast, approximative solution for image-based lighting of curve-based hair, capturing both diffuse and specular reflection with occlusion.

Ivan Neulander
Rhythm & Hues Studios
ivan@rhythm.com

A Self-Shadow Algorithm for Dynamic Hair Using Density Clustering

A new approach to render self-shadows for dynamic hair, based on density estimation. Thousands of hair strands can be rendered at interactive frame rates on a GPU.

Tom Mertens
Limburgs Universitair Centrum
tom.mertens@luc.ac.be

Philippe Bekaert
Limburgs Universitair Centrum

Jan Kautz
Massachusetts Institute of Technology

Frank Van Reeth
Limburgs Universitair Centrum

3:45 - 5:30 pm
Room 501AB

Session Chair
Ming C. Lin, University of North Carolina at Chapel Hill

Haptics and Sound

A Framework for Haptic Rendering of Large-Scale Virtual Environments

A software framework for haptic rendering of large-scale virtual environments. A test application shows the framework in use.

Mashhuda Glencross
The University of Manchester
khotem@cs.man.ac.uk

Roger Hubbold
The University of Manchester

Haptic Rendering of Interaction Between Textured Models

A new algorithm to display haptic texture information resulting from the interaction between two textured objects. The algorithm computes contact forces using low-resolution geometric representations along with texture images.

Miguel Otaduy
University of North Carolina at Chapel Hill
otaduy@cs.unc.edu

Nitin Jain
Avneesh Sud
Ming C. Lin
University of North Carolina at Chapel Hill

Multi-Resolution Sound Rendering

An approximation technique based on hierarchical stochastic sampling that allows sound rendering in highly complex acoustic environments (scenes containing a large number of sound sources).

Michael Wand
Universität Tübingen
wand@gris.uni-tuebingen.de

Wolfgang Strasser
Universität Tübingen

Virtual Instrument Design and Animation

Using 3D models to determine the desired sound quality from an instrument. The technique includes novel extensions to sound synthesis for animation and sound synthesis for computer music.

Cynthia Bruyns
University of California, Berkeley
cbruyns@cs.berkeley.edu

Carlo Séquin
Robert Taylor
University of California, Berkeley

Tuesday, 10 August

3:45 - 5:30 pm
West Hall A

Session Chair
Darren Hendler, Digital Domain

Creatures of "Van Helsing"

Be-Heading a Vampire: Combining 2D and 3D Elements With On-Set Motion Capture to Create the Vampire Brides in "Van Helsing"

For "Van Helsing," ILM developed novel methods for capturing the motion of a performer during filming and combining this 3D motion with the filmed elements to create a single character.

Douglas Griffin
Industrial Light + Magic
dougg@ilm.com

Jeff Saltzman
Jeff White
Kevin Wooley
Industrial Light + Magic

Jiggly Bits and Motion Retargeting: Bringing the Motion of Hyde to Life in "Van Helsing" With Dynamics

To achieve a high level of realism for the character Hyde in "Van Helsing," new tools were built to preserve dynamics with motion capture and add dynamics with flesh simulation.

Ryan Kautzman
Industrial Light + Magic
ryank@ilm.com

Andy Buecker
Doug Griffin
Andrea Maiolo
Industrial Light + Magic

Posing as a Werewolf: The Creature Matchmove Tool Used for "Van Helsing"

A demonstration of Poseur, ILM's pose-based animation tool used for matching the live-action backgrounds on "Van Helsing" for extremely tight creature matchmoves.

Marla Newall
Industrial Light + Magic
marla@ilm.com

Chris Monks
Cary Phillips
Nicolas Popravka
Jason Smith
James Tooley
Industrial Light + Magic

There's More Than One Way to Skin a Wolf: Wolf Transformations in "Van Helsing"

Techniques for the wolf/human transformation shots in "Van Helsing," including simulation of hair on tearing cloth and rendering thick fur and gory skin.

Ari Rapkin
Industrial Light + Magic
ari@ilm.com

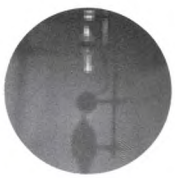
Nigel Sumner
Steve Aplin
Andrew Cawrse
Lee Fulton
Tony Pelle
Philip Peterson
Eric Wong
Industrial Light + Magic

Long Hair and Fur for "Van Helsing"

Production experience and techniques for placement, styling, simulation, and rendering of long hair and fur for digital monsters and doubles on "Van Helsing."

Zoran Kacic-Alesic
Industrial Light + Magic
zoran@ilm.com

Tim Brakensiek
David Bullock
Carl Frederick
Lee Uren
Eric Wong
Industrial Light + Magic



Wednesday, 11 August

8:30 - 10:15 am
Room 502A

Session Chair
Carolina Cruz-Neira, Iowa State University

Frowns, Smiles, Pouts

Adaptable Setup for Performance-Driven Facial Animation

An animation system that automates the most challenging tasks in setting up convincing facial animation: creation of facial actions in articulate form and motion during all intensities.

Volker Helzle
Filmakademie Baden-Württemberg
volker.helzle@filmakademie.de

Christoph Biehn
Filmakademie Baden-Württemberg

Florian Linnner
Freelance Artist

Thomas Schlömer
Filmakademie Baden-Württemberg

Constraint-Based Synthesis of Visual Speech

A novel method for synthesis of visual speech movements based upon constrained optimization techniques.

James D. Edge
University of Sheffield
j.edge@dcs.shef.ac.uk

Steve Maddock
University of Sheffield

Multilinear Models for Facial Synthesis

A bilinear 3D face model with separate control of identity and expression. The model can be built from incomplete datasets of scanned faces and intuitively controled via tracking.

Daniel Vlasic
Massachusetts Institute of Technology
drdaniel@mit.edu

Matt Brand
Hanspeter Pfister
Mitsubishi Electric Research Labs

Jovan Popović
Massachusetts Institute of Technology

Improved Automatic Caricature by Feature Normalization and Exaggeration

An improved formalization of automatic caricature that extends a standard approach to correctly account for the population variance of facial features.

Zhenyao Mo
University of Southern California
zmo@usc.edu

J. P. Lewis
Ulrich Neumann
University of Southern California

8:30 - 10:15 am
Room 515B

Session Chair
Cindy Grimm, Washington University

Art-Driven Modeling

Tile-Based Kolam Patterns

A catalog of 16 diamond-shaped tiles that can be used to create classic "kolam" line drawings that are popular in South Indian art and culture.

Saty Raghavachary
DreamWorks Animation
saty@smartcg.com

Column Modeling

An easy-to-use art and design tool that allows users to create complex and architecturally interesting shapes with large numbers of beams and columns.

Ergun Akleman
Texas A&M University
ergun@viz.tamu.edu

Esan Mandal
Vinod Srinivasan
Texas A&M University

Cords: Keyframe Control of Curves With Physical Properties

Cords are 3D curves with empirical physical properties of strength and elasticity that wrap and twist around geometry. This sketch describes cords and highlights their use in the film "Ryan."

Patrick Coleman
University of Toronto
patrick@dgp.toronto.edu

Karan Singh
University of Toronto

Modeling Expressive 3D Caricatures

An educational method to teach students artistic concepts of abstraction and exaggeration by modeling expressive 3D caricatures. All students, regardless of their artistic abilities, can create convincing caricatures.

Ergun Akleman
Texas A&M University
ergun@viz.tamu.edu

Jon Reisch
Texas A&M University

Wednesday, 11 August

8:30 - 10:15 am
West Hall A

Session Chair
Raquel Coelho, Tippet Studio

Feature Creatures

"I,Robot": Character Pipeline, Tools, and Methods

An explanation and detailed overview of the character pipeline created for the feature film "I,Robot," an adapted screen play based on Isaac Asimov's collection of stories about robots and humanity.

Erick Miller
Digital Domain
erickmiller@yahoo.com

Paul George
Jonathan Gerber
Steve Preeg
Serge Sretschinsky
Digital Domain

Throwing A CGI Curve Ball: Cartoony Character Setup on "Chicken Little"

From broad physicality to subtle acting, this sketch discusses the philosophical concerns and technical challenges relevant to the configuration of cartoony 3D characters in Disney's animated feature "Chicken Little."

Kevin Geiger
Walt Disney Feature Animation
kevin.geiger@disney.com

The Tar Monster: Creating a Character With Fluid Simulation

The Tar Monster in "Scooby Doo 2" was created using fluid simulation. This sketch describes how the flow and texture were simulated based on an animated character model.

Mark Wiebe
Frantic Films
mwiebe@franticfilms.com

Ben Houston
Frantic Films

Bulging Muscles and Sliding Skin: Deformation Systems for "Hellboy"

For "Hellboy," Tippett Studio created ranges of realistic motion and deformations with a fast-solving, semi-interactive, and physically based muscle and skin system that fit into our existing animation pipeline.

Paul G. Thuriot
Tippett Studio
pthuriot@hotmail.com

William Todd Stinson
Tippett Studio

10:30 am - 12:15 pm
Room 502A

Session Chair
Eric Haines, Autodesk, Inc.

Texture

PACKMAN: Texture Compression for Mobile Phones

A new lossy texture compression scheme, targeted for mobile devices, that compresses 2 x 4 blocks into 32 bits.

Jacob Ström
Ericsson Research
jacob.strom@ericsson.com

Tomas Akenine-Moller
Lunds universitet/Ericsson Mobile Platforms

Tile-Based Texture Mapping on Graphics Hardware

A tile-based texture mapping algorithm running on GPUs that functions transparently as an arbitrarily large texture mipmap while consuming only a small and fixed amount of texture memory.

Li-Yi Wei
NVIDIA Corporation
liyiwei@graphics.stanford.edu

Constrained Segmentation of Complex Models for Image-Based Texture Editing

A constrained segmentation method for partitioning 3D models for texture mapping. Region boundaries conform to salient features, respecting user-imposed constraints. An application to virtual paint restoration is illustrated.

Ioana Boier-Martin
IBM T.J. Watson Research Center
ioana@us.ibm.com

Holly Rushmeier
Yale University

Richard Giantisco
Freelance 3D Artist

Subband Encoding of High-Dynamic-Range Imagery

A backwards-compatible format for lossy encoding of high-dynamic-range images that fits within a standard JPEG wrapper and looks like a tone-mapped image.

Gregory Ward
Anyhere Software
Sunnybrook Technologies

Maryann Simmons
Walt Disney Feature Animation

Wednesday, 11 August

10:30 am - 12:15 pm
Room 515B

Session Chair
Ronen Barzel, Pixar Animation Studios

Feasible Fluid, Foliage, and Fog

Practical Simulation of Surface Tension Flows

A production-tested method for incorporating surface tension effects into an existing 3D fluid solver. The method avoids the excessive time-step restriction normally associated with surface tension.

Jonathan M. Cohen
Rhythm & Hues Studios
jcohen@rhythm.com

M. Jeroen Molemaker
Rhythm & Hues Studios and University of California, Los Angeles

Image-Based Fluids

For "Shrek 2," image-based fluid simulation enabled more precise art direction to achieve realistic, believable fluid interaction between characters and their environments.

Lewis Kofsky
PDI/DreamWorks
lkofsky@pdi.com

Leveraging Third-Party Tools for Art-Driven Fluids & Foliage

For "Shrek 2," we combined Maya technologies for foliage and fluids with PDI/DreamWorks' in-house tools to create an improved feedback loop among art directors, modelers, and the final rendered imagery.

Francois Antoine
PDI/DreamWorks
francois@pdi.com

David Allen
PDI/DreamWorks

Fast Solutions to Gas Volumetrics in "Matrix Revolutions"

In "Matrix Revolutions," a number of shots required volumetric effects of clouds and gases that could be flown through using limited rendering resources and RenderMan. This sketch presents the solutions.

John Gibson
Digital Domain
(presenting for Tippett Studio)
jmgibson@d2.com

Davy Wentworth
Tippett Studio

1:45 - 3:30 pm
Room 502A

Session Chair
Juan Buhler, PDI/DreamWorks

Global Illumination

Radiance Caching and Local Geometry Correction

A new method that computes indirect illumination by approximating the energy from distant surfaces and nearby surfaces separately.

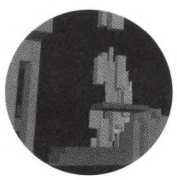
Okan Arikan
University of California, Berkeley
okan@cs.berkeley.edu

David A. Forsyth
James F. O'Brien
University of California, Berkeley

Image-Based Lighting Using a Piecewise-Constant Importance Function

An unbiased Monte Carlo scheme for incorporating an image-based light source into a global illumination renderer.

Jonathan M. Cohen
Rhythm & Hues Studios
jcohen@rhythm.com



Inelastic Scattering in Participating Media Using Curved Photon Mapping

Lucifer is a global illumination environment capable of handling inhomogeneous, participating media while taking into account multiple inelastic scattering. Several mechanisms of the human visual system are also computed.

Diego Gutierrez
Universidad de Zaragoza
diegog@unizar.es

Oscar Anson
Adolfo Muñoz
Francisco J. Seron
Universidad de Zaragoza

Ray Maps for Global Illumination

A data structure for representing light transport. Whole-ray sequences for proximity queries are stored. Application: density estimation including conservative update for moving objects.

Vlastimil Havran
Max-Planck-Institut für Informatik
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Jiri Bittner
Technische Universität Wien

Hans-Peter Seidel
Max-Planck-Institut für Informatik

Wednesday, 11 August

1:45 - 3:30 pm
Room 515B

Session Chair
Raquel Coelho, Tippett Studio

Art and Architecture

Superimposing Pictorial Artwork With Projected Imagery

A novel approach for using pictorial artwork as information displays and how to combine almost any kind of computer-generated visual information directly with the painted content.

Gordon Wetzstein
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Oliver Bimber
Erich Bruns
Franz Coriand
Alexander Kleppe
Tobias Langlotz
Stefanie Zollmann
Bauhaus-Universität Weimar

Abstracting Design, Designing Abstractions: Use of Computer Graphics in Early Stages of Architectural Design

This sketch investigates digital imagery that interacts and informs architectural design. Imagery that goes beyond "simple" digital versions of traditional methods and becomes a visually attractive and intellectually stimulating partner.

Andrzej Zarzycki
Technomorphic
zarzycki@alum.mit.edu

Unlighting the Parthenon

A method for calculating the reflectance of the surface of a complex diffuse object in arbitrary natural lighting.

Christopher Tchou
USC Institute for Creative Technologies
tchou@ict.usc.edu

Paul Debevec
Per Einarsson
Marcos Fajardo
Jessi Stumpfel
USC Institute for Creative Technologies

Photometric Stereo for Archeological Inscriptions

A low-cost system suitable for use in the field for acquiring high-resolution geometry and reflectance properties using photometric stereo.

Per Einarsson
USC Institute for Creative Technologies
perei559@student.liu.se

Paul Debevec
Tim Hawkins
USC Institute for Creative Technologies

3:45 - 5:30 pm
Room 502A

Session Chair
Ming C. Lin, University of North Carolina at Chapel Hill

Surface Modeling

Functionally Optimized Subdivision Surfaces

Subdivision followed by optimization is a framework for efficiently constructing and optimizing smooth surfaces under various functionals. Significant speed-ups are obtained by using discrete approximations and direct vertex-move calculations.

Pushkar Joshi
University of California, Berkeley
ppj@eecs.berkeley.edu

Carlo H. Séquin
Ryo Takahashi
University of California, Berkeley

Fair LVC Curves on Subdivision Surfaces

Embedded curves with linearly varying curvature (LVC) are fair, like geodesics, but they permit specification of their two end tangents. This sketch presents an efficient iterative hierarchical construction on subdivision surfaces.

Carlo H. Séquin
University of California, Berkeley
sequin@cs.berkeley.edu

Ling Xiao
University of California, Berkeley

Re-Usable Implicit Functions

Re-tooling the non-zero set about an implicit function allows for repeated application of implicit operations, dramatically broadening the modeling facility of implicit modeling.

Alyn Rockwood
Colorado School of Mines
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Roman Tankelevich
Colorado School of Mines

Nice and Fast Implicit Surfaces Over Noisy Point Clouds

A new definition of implicit surfaces over noisy point clouds, based on moving least squares and proximity graphs, that can be evaluated quickly and produce high-quality surfaces.

Gabriel Zachmann
Universität Bonn
zach@cs.uni-bonn.de

Jan Klein
Universität Paderborn

Wednesday, 11 August

3:45 - 5:30 pm
Petree Hall C

Session Chair
Leo Hourvitz, Maxix/EA

Effects Omelette

From the Ground Up: Building a Machine City for "Matrix: Revolutions"

Development and production of a massive city built by and for machines in "The Matrix: Revolutions" relied upon procedurally and hand-dressed architecture, built from carefully orchestrated model component libraries.

Charles Rose
Tippett Studio
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Procedural Petticoats in "Shrek 2"

In "Shrek 2," the Fairy Godmother's ruffled petticoats were produced by creating the geometry procedurally as a post process to give the garment the illusion of ruffles underneath.

Matt Baer
PDI/DreamWorks
mattb@pdi.com

Fireballs in "Shrek 2"

For "Shrek 2," PDI/DreamWorks added the ability to art-direct animated fireballs, which allowed realistic fireball launching without being bound by the laws of physics.

Arnauld Lamorlette
PDI/DreamWorks
arnauld@pdi.com

Matt Baer
Harry Max
PDI/DreamWorks

Making of the Superpunch

The Superpunch was considered the most difficult shot in The Matrix sequels, most notably due to the challenge of showing a full-frame, computer-generated face of a known human actor.

George Borshukov
ESC Entertainment
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Ken Faiman
John Jack
Oystein Larsen
Tadao Mihashi
Kody Sabourin
Masuo Suzuki
ESC Entertainment

Oliver James
Scot Schinderman
formerly ESC Entertainment

Thursday, 12 August

8:30 - 10:15 am
Room 502A

Session Chair
Ed Angell, University of New Mexico

Rendering

Experimental Validation of Analytical BRDF Models

A guide to the performance of several popular BRDF models, based on experimental validations employing a large dataset of real BRDFs measured with high precision.

Addy Ngan
Massachusetts Institute of Technology
addy@mit.edu

Frédo Durand
Wojciech Matusik
Massachusetts Institute of Technology

RenderMonkey: An Effective Environment for Shader Prototyping and Development

A new process for real-time shader prototyping and development using an improved development environment for shader content creation: the RenderMonkey IDE.

Natalya Tatarchuk
ATI Research, Inc.
natasha@ati.com

Rendering Skewed Plane of Sharp Focus and Associated Depth of Field

A model of a view camera to enable computer generation of images with a skewed plane of sharp focus and associated skewed depth of field region.

Brian A. Barsky
University of California, Berkeley
barsky@cs.berkeley.edu

Egon Pasztor
University of California, Berkeley

zDOF: A Fast, Physically Accurate Algorithm for Simulating Depth-of-Field Effects in Synthetic Images Using Z-Buffers

A two-step image processing technique for accurately simulating depth-of-field effects. Step one spreads pixels out based on depth and camera parameters. Step two normalizes pixel intensities from accumulated pixel coverage.

Clay Budin
BlueSky Studios
clay@blueskystudios.com

8:30 - 10:15 am
Room 515A

Session Chair
Cindy Grimm, Washington University

Modeling Medley

Refolding Planar Polygons

A guaranteed technique for generating intersection-free interpolation sequences between non-intersecting planar polygons. Our algorithm guides a user-supplied distance heuristic that determines the overall character of the interpolation sequence.

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James F. O'Brien
University of California, Berkeley

Erik D. Demaine
Massachusetts Institute of Technology

Modeling and Simulation of Sharp Creases

This sketch shows a complex combination of stiff and soft behavior of sharp creases of cloth when it makes an angled ridge or crumples to form breaks.

Min-Hyung Choi
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minchoi@acm.org

Min Hong
University of Colorado Health Sciences Center

Samuel Welch
University of Colorado at Denver

Prong-Features Detection of a 3D Model Based on the Watershed Algorithm

In this sketch, a simple and robust prong-features detection algorithm is proposed for us in many applications, such as model decomposition, skeleton extraction, and object matching.

Fu-Che Wu
National Taiwan University
joyce@cmlab.csie.ntu.edu.tw

Bing-Yu Chen
Rung-Huei Liang
Ming Ouhyoung
National Taiwan University

Similarity-Based Surface Modeling Using Geodesic Fans

Intuitive, efficient surface modeling that replicates local changes such as deformations, painting, or filtering at all similar areas of the surface using geodesic fans, a novel neighborhood representation for surfaces.

Steve Zelinka
University of Illinois at Urbana-Champaign
zelinka@uiuc.edu

Michael Garland
University of Illinois at Urbana-Champaign

Thursday, 12 August

8:30 - 10:15 am
Room 515B

Session Chair
Mel Slater, University College London

Monkeying With Reality

Imitation and Social Intelligence for Synthetic Characters

Max, an anthropomorphic animated mouse, is able to observe the actions he sees his friend Morris Mouse performing and compare them to the actions he knows how to perform himself.

Daphna Buchsbaum
Massachusetts Institute of Technology
Media Lab, Synthetic Characters Group
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Bruce Blumberg
Massachusetts Institute of Technology
Media Lab, Synthetic Characters Group

3D Character Extension for Stop-Motion Puppets

Creating human-like and expressive eye and upper facial movement by employing a 3D digital character extension for stop-motion puppet monkeys.

Melanie Beisswenger
Filmakademie Baden-Württemberg
melanie.beisswenger@web.de

X-Ray Window: Portable Visualization on the International Space Station

With this application, ISS crew members will utilize graphical tablets and augmented reality eyewear to "see through" the walls of station modules to other modules' interiors and the station exterior.

William W. White
Southern Illinois University
wwhite@siue.edu

BLADESHIPS: An Interactive Attraction in Mixed Reality

BLADESHIPS, a new type of interactive attraction in a mixed-reality environment, is a game in which players compete by controlling belt-shaped flying virtual objects in a real room.

Masayuki Takemura
University of Tsukuba
takemura@image.esys.tsukuba.ac.jp

Shungo Haraguchi
Yuichi Ohta
University of Tsukuba

8:30 - 10:15 am
Petree Hall D

Session Chair
Leo Hourvitz, Maxis/EA

Art on the Small Screen

The Art of SSX3: A Behind-the-Scenes Look at the Visual Development of a Video Game

The creative process used to develop visuals that support and enhance game play.

Henry LaBounta
Electronic Arts Canada
henryl@ea.com

Quality Issues in Asset Creation on a Massive Scale for EverQuest II

Unforeseen problems and novel solutions in creative and integrated environments on the EverQuest II project reveal the future of real-time rendered art production in a commercial environment.

Stuart Compton
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scompton@soe.sony.com

An Efficient Production Pipeline Used to Create 52 Full-3D CGI Anime Episodes

How an effective production workflow was established to produce a 52-episode 3D CGI anime series in a short period of time (the same pipeline used on SD GUNDAM FORCE).

Yoshishige Matsuno
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Hiroshi Arima
Artify,Inc.

Shigeru Horiguchi
Ken Suzuki
Sunrise, Inc.

Workflow and CG Tools for the Cartoon TV Program "Monkey Turn"

Unique workflow and CG tools for efficiently making dynamic motorboat-race scenes in the Japanese cartoon TV program "Monkey Turn."

Satoru Yamagishi
OLM Digital, Inc.
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Megumi Kondo
Hiroshi Uchibori
Ken Anjyo
OLM Digital,Inc.

Thursday, 12 August

10:30 am - 12:15 pm
Room 502A

Session Chair
Carolina Cruz-Neira, Iowa State University

Augmented Reality

Inside-Out Interaction: An Interaction Technique for Dealing With Large Interface Surfaces Such as Web Pages on Small-Screen Displays

An interaction technique for navigating large interface surfaces such as web pages, in which the user manipulates the physical display device rather than the virtual surface itself.

Daniel Fallman
Umeå universitet
dfallman@informatik.umu.se

Andreas Lund
Mikael Wiberg
Umeå universitet

Video See-Through and Optical Tracking With Consumer Cell Phones

A prototype solution for video-see-through AR on consumer cell phones. It supports optical tracking of passive paper markers and correct integration of graphics into the live video stream.

Mathias Möhring
Bauhaus-Universität Weimar
mathias.moehring@uni-weimar.de

Oliver Bimber
Christian Lessig
Bauhaus-Universität Weimar

An Autostereoscopic Optical See-Through Display for Augmented Reality

A novel projection-based autostereoscopic optical see-through display that enables minimally intrusive augmented reality. A holographic optical element eliminates the need for the user to wear any equipment.

Alex Olwal
The Royal Institute of Technology
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Jonny Gustafsson
Christoffer Lindfors
The Royal Institute of Technology

Wearable Scanning Laser Projector (WSLP) for Augmenting Shared Space

A novel wearable apparatus for augmented reality. The head-mounted projection system uses rapidly scanned lasers to display information directly onto any object using the object as a projection screen.

Taro Maeda
NTT Communication Science Laboratories
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Hideyuki Ando
NTT Communication Science Laboratories

10:30 am - 12:15 pm
Room 515A

Session Chair
Baining Guo, Microsoft Research Asia

Lighting

Spherical Harmonic Gradients

Using spherical harmonic gradients for efficient extrapolation of incident radiance enables real-time close-range illumination using only a single sample for the incident lighting.

Thomas Annen
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Frédo Durand
Jan Kautz
Massachusetts Institute of Technology

Hans-Peter Seidel
Max-Planck-Institut für Informatik

Non-Linear Kernel-Based Precomputed Light Transport

A real-time method for rendering static objects from arbitrary views under distant all-frequency lighting. The method can render reflections, interreflections, and subsurface scattering using precomputed light transport.

Paul Green
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Frédo Durand
Massachusetts Institute of Technology

Henrik Wann Jensen
University of California, San Diego

Jan Kautz
Wojciech Matusik
Massachusetts Institute of Technology

Bidirectional Importance Sampling for Illumination From Environment Maps

Introducing bidirectional importance sampling, a method for rendering that samples visibility according to an importance derived from the product of BRDF and environment-map illumination.

David Burke
The University of British Columbia
dburke@cs.ubc.ca

Abhijeet Ghosh
Wolfgang Heidrich
The University of British Columbia

Wrangling Lighting and Rendering Data at Disney Feature Animation

A user-friendly system for wrangling scene data and relationships, which serves as the foundation for Disney's internal lighting package, Lumiere, currently being used in production on "Chicken Little."

Mark A. McLaughlin
Walt Disney Feature Animation
mark.mclaughlin@disney.com

Joseph M. Lohmar
Ernest J. Petti
Chris Springfield
Lewis Wakeland
Walt Disney Feature Animation

Thursday, 12 August

10:30 am - 12:15 pm
Room 515B

Session Chair
Joanna Berzowska, XS Labs

Intermedia Performance

Conceiving Embodiment: The Dance Architecture of Spawn

Spawn is an interactive dance architecture that aims to conceive an embodied space by investigating presence and being in environments that merge physical and virtual dimensions (mixed realities).

Mette Ramsgard Thomsen
University of Brighton
m.ramsgard-thomsen@brighton.ac.uk

Carol Brown
University of Surrey Roehampton

NightDriving: Videodance in Performance

This sketch describes the process of creating NightDriving, a hybrid media work that combines live performance of contemporary dance with digital video animations derived from the movement of the dancers.

John Crawford
electricFX Media
john@electricfx.com

Lisa Naugle
University of California, Irvine

Illusory Interactive Performance by Self-Eye Movement

Using saccade-based display, the audience can perceive different images from what physically exists on the stage. The display enables illusory interactive performance based on audiences eye movements.

Junji Watanabe
The University of Tokyo
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Tetsutoshi Tavata
cell/66b

Mariana A. Verdaasdonk
Queensland University of Technology,
cell/66b

Hideyuki Ando
Taro Maeda
NTT Corporation

Susumu Tachi
The University of Tokyo

Live Cinema: An Instrument for Cinema Editing as a Live Performance

The Live Cinema research project aims at building an expressive tangible instrument for cinema editing and improvisation as a live performance.

Michael Lew
Media Lab Europe
lew@media.mit.edu

10:30 am - 12:15 pm
Petree Hall D

Session Chair
Darren Hendler, Digital Domain

Production Rendering

Reflectance Field Rendering of Human Faces in "Spider-Man 2"

Techniques introduced in the SIGGRAPH 2000 Paper, Acquiring the Reflectance Field of a Human Face, are used to render digital versions of Tobey Maguire and Alfred Molina for "Spider-Man 2."

Mark Sagar
Sony Pictures Imageworks
marksagar@imageworks.com

John Monos
John Schmidt
Dan Ziegler
Sing-choong Foo
Remington Scott
Jeff Stern
Chris Waegner
Peter Nofz
Sony Pictures Imageworks

Tim Hawkins
Paul Debevec
USC Institute for Creative Technologies

Rendering Translucent Robots

One of the difficulties of "I,Robot" was rendering the robots' translucent shell. We used multiple render passes through AOVs and compositing to achieve the translucent effects.

Chris Harvey
Digital Domain
charvey@d2.com

Paul George
Digital Domain

Generalized Approach to Rendering Fabric

For "Shrek 2," a shader was required to render elegant fabrics. Instead of specific shaders for each fabric, we designed one that was general and extendable to many types of fabric.

Rick Glumac
PDI/DreamWorks
rickg@pdi.com

David Deopp
PDI/DreamWorks

A Perceptual Metric for Production Testing

A case study of a perceptually based image comparisonprocess used in testing rendering software in a feature-animation environment.

Yangli Hector Yee
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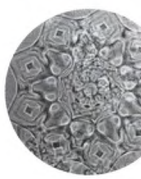
hyee@pdi.com

Anna Newman
PDI/DreamWorks



Thursday, 12 August

1:45 - 3:30 pm
Room 502A

Session Chair
Joanna Berzowska, XS Labs

Mixed-Reality Applications

The Body's Surface as a Multimedia Interface: Closed-Eyes Nonverbal Telehaptic Communication

Physically distant people, sitting still in a closed-eyes shared virtual space, remotely communicate their presence (haptically and aurally) through networked prototypes that sense physiological measures of emotions.

William Meyer
Exploratorium
billm@exploratorium.edu

Fragra: A Visual-Olfactory VR Game

A VR game that enables users to explore the interactive relationship between olfaction and vision. Observers must distinguish what each visual and olfactory input means and compare them.

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Kohyama Kazuhiro
Chihara Kunihiro
Imura Masataka
Sawa Sayuri
Motoyashiki Shogo
Takeda Tadayuki
Amada Takashi
Nara Institute of Science and Technology

Veggie Diaries: Urban Mobile MR Entertainment

Using mixed-reality systems for entertainment in a mobile context. Veggie Diaries integrates real-world outdoor objects with game elements, using MR techniques and camera-mounted PDAs.

Kenji Iguchi
Keio University
needle@heistak.com

Tomoki Saso
Masa Inakage
Keio University

Outdoor Mixed Reality Utilizing Surveillance Cameras

An outdoor mixed-reality system designed for pedestrians who carry a camera-attached PDA. The system utilizes surveillance cameras both for showing hidden areas and calibrating a PDA camera.

Yoshinari Kameda
University of Tsukuba
kameda@image.esys.tsukuba.ac.jp

Taisuke Takemasa
Yuichi Ohta
University of Tsukuba

1:45 - 3:30 pm
Room 515A

Session Chair
Baining Guo, Microsoft Research Asia

Computer Vision

Interactive Scene Modeling From Dense Color and Sparse Depth

A fast, easy-to-use, and inexpensive modeling system that builds scene models that support realistic interactive rendering from a wide range of viewing locations.

Gleb Bahmutov
Purdue University
bahmutov@cs.purdue.edu

Voicu Popescu
Elisha Sacks
Purdue University

Towards a Unified Approach to 3D Environment Capture and Rendering

A system for unifying contemporary image-based modeling and laser scanning techniques for scene acquisition and rendering.

Gordon Watson
University of Edinburgh
g.c.watson@ed.ac.uk

Bruce Lamond
University of Edinburgh

Extracting Face Bump Maps From Video

Capture of bump maps for human faces using inexpensive hardware. This system tracks the head rather than moving the light source, so photometric stereo can be used with a static light source.

James Paterson
Oxford University
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Andrew Fitzgibbon
Oxford University

Learning Silhouette Features for Control of Human Motion

A vision-based performance interface for controlling animated human characters.

Liu Ren
Carnegie Mellon University
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Gregory Shakhnarovich
Massachusetts Institute of Technology

Jessica K. Hodgins
Carnegie Mellon University

Hanspeter Pfister
Mitsubishi Electric Research Laboratories

Paul Viola
Microsoft Research

Thursday, 12 August

1:45 - 3:30 pm
Room 515B

Session Chair
Raquel Coelho, Tippett Studio

Beautiful Things

A New Style of Ancient Culture: Animated Chinese Dunhuang Murals

A fresh artistic form named "animated murals" is based on Chinese Dunhuang murals and Yunnan Zhongcai painting with a set of digital techniques. One result is fancy visual effects.

I-Fan Shen
Fudan University
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Chen-Jia Li
Shanghai True-Color Multimedia Co.

Yi-Bo Zhu
Fudan University

The Electric Sheep Distributed Screen Saver

A distributed screen saver that harnesses idle computers into a render farm with the purpose of animating and evolving artificial life-forms.

Scott Draves
spot_siggraph@draves.org

All This Useless Beauty – A 200 Megapixel Panorama

A three-inch-tall, by 50-foot-long panoramic image created as a frame to capture everyday objects, places, and physical acts, and present them as art.

Anthony Santoro
Independent Artist
anthony@verizon.net

Paul G. Kry
The University of British Columbia

Making Space for Time in Time-Lapse Photography

TimeMaps are a technique for simultaneously displaying multiple points in time for the same scene. Long-term and periodic trends are more apparent compared to existing techniques and traditional time-lapse renderings.

Michael Terry
Georgia Institute of Technology
mterry@cc.gatech.edu

Gabriel J. Brostow
Diane Gromala
Grace Ou
Jaroslav Tyman
Georgia Institute of Technology

1:45 - 3:30 pm
Petree Hall D

Session Chair
Juan Buhler, PDI/DreamWorks

Fluids and Level Sets

Galilean Invariance for Fluid Simulation

A novel technique for implementing an adaptive grid for fluid simulation. The technique is largely based on the principle of Galilean Invariance.

Maurya Shah
USC Institute for Creative Technologies
mauryash@usc.edu

Jonathan Cohen
Rhythm & Hues Studios

Penne Lee
Frederic Pighin
USC Institute for Creative Technologies

DD::Fluid::Solver::SolverFire

The practical realities of developing fire simulation software for visual effects.

Nafees Bin Zafar
Digital Domain
nafees@d2.com

Henrik Falt
Mir Zafar Ali
Chamberlain Fong
Digital Domain

Creating Animations of Fluids and Cloth With Moving Characters

A computer-simulation technique for creating animations, including fluids and cloth with moving characters.

Nobuhiro Kondoh
Toshiba Corporation
nobuhiro.kondoh@toshiba.co.jp

Atsushi Kunimatsu
Toshiba Corporation

Shuuji Sasagawa
Toshiba Information Systems Corporation

RLE Sparse Level Sets

A novel scalable level-set representation, the RLE sparse level set, and its usefulness in representing traditionally animated polygon-based characters with both fidelity and robustness

Ben Houston
Frantic Films
ben@exocortex.org

Chris Batty
Mark Wiebe
Frantic Films

Thursday, 12 August

3:45 - 5:30 pm
Room 515A

Session Chair
Ed Angel, University of New Mexico

Visualization

Visualization of Heart Function

A 3D model of functional anatomy of the human heart for medical education. The model will be capable of visualizing healthy and failing heart function and dysfunction.

Vassili Hurmusiadis
Primal Pictures Ltd
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Chris Briscoe
Nicholas Clifford
Primal Pictures Ltd

Synaesthesia, Data Mapping, and Synchronicity

In digital art, number, like neural impulses, can represent color or sound or both. Digital synaesthesia is easy. Can it also make aesthetic sense?

Brian Evans
University of Alabama
brian.evans@ua.edu

Model and Control of Simulated Respiration for Animation

An anatomically inspired, physically based model of the human torso for visual simulation of respiration using a mixed system of rigid and deformable parts.

Victor B. Zordan
University of California, Riverside
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Bhrigu Celly
Bill Chiu
Paul C. DiLorenzo
University of California, Riverside

A Heightfield on an Isometric Grid

Traditional heightfields have suboptimal smoothness, which is particularly bad for ocean waves and geology data. We use 60-degree axes to build a better heightfield that is equally hardware efficient.

Morgan McGuire
Brown University
morgan@cs.brown.edu

Peter G. Sibley
Brown University

3:45 - 5:30 pm
Petree Hall C

Session Chair
Eric Haines, Autodesk, Inc.

GPU2

CC Shadow Volumes

A method to accelerate shadow volumes by culling shadow casters that lie completely in shadow and clamping the volumes to just the regions occupied by shadow receivers.

Brandon Lloyd
University of North Carolina at Chapel Hill
blloyd@cs.unc.edu

Jeremy Wendt
Naga Govindaraju
Dinesh Manocha
University of North Carolina at Chapel Hill

Practical Real-Time Hair Rendering and Shading

A real-time algorithm for hair rendering using a polygon model, which was used in the real-time animation "Ruby: The Double Cross," appearing in the SIGGRAPH 2004 Computer Animation Festival.

Thorsten Scheuermann
ATI Research
thorsten@ati.com

Real-Time Skin Rendering on Graphics Hardware

An algorithm that approximates the appearance of subsurface scattering by blurring the diffuse illumination in texture space using graphics hardware.

Pedro V. Sander
ATI Research
psander@ati.com

David Gosselin
Jason L. Mitchell
ATI Research

Displacement Mapping With Ray-Casting in Hardware

A new method for rendering displacement-mapped planes using per-pixel ray-casting in programmable graphics hardware.

Keith Yerex
University of Alberta
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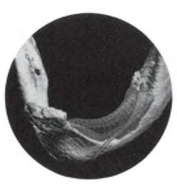
Martin Jagersand
University of Alberta



Thursday, 12 August

3:45 - 5:30 pm
Petree Hall D

Session Chair
Baining Guo, Microsoft Research Asia

Image-Based Rendering

lgf3: A Versatile Framework for Image-Based Modeling and Rendering

The lgf Project is an implementation framework for image-based modeling and rendering research and application development. It combines the techniques and approaches of both fields in a single versatile platform.

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Universität Erlangen-Nürnberg
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Günther Greiner
Universität Erlangen-Nürnberg

A Self-Reconfigurable Camera Array

A camera array that is self-reconfigurable, real-time image-based rendering of dynamic scenes, and how to move the cameras arround to enhance rendering quality.

Tsuhan Chen
Carnegie Mellon University
tsuhan@cmu.edu

Cha Zhang
Carnegie Mellon University

Reflection Morphing

A novel algorithm for rendering accurate reflections on general reflectors at interactive rates.

Voicu Popescu
Purdue University
popescu@cs.purdue.edu

Andrew Martin
Purdue University

Real-Time Rendering for Autostereoscopic 3D Display Systems

A real-time rendering method using a pixel shader for novel 1D integral image-based 3D display and its system configuration.

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Yuzo Hirayama
Hitoshi Kobayashi
Kazuki Taira
Shingo Yanagawa
Toshiba Corporation

3:45 - 5:30 pm
West Hall B

Session Chair
Juan Buhler, PDI/DreamWorks

"The Day After Tomorrow"

Growing Up With Fluid Simulation on "The Day After Tomorrow"

Fluid simulation is a popular topic in the CG industry, and there are many considerations, pitfalls, and caveats to properly reap the benefits of physical simulation.

Jason Iversen
Digital Domain
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Ryo Sakaguchi
Digital Domain

"The Day After Tomorrow" Twister Sequence Toolkit

This sequence required a pipeline that guaranteed that adjustments made "downstream" of the workflow would require little adjustment "upstream," and that the twister system could create a variety of looks.

Jonah Hall
Digital Domain
jonah@d2.com

Procedural Building Destruction for "The Day After Tomorrow"

For "The Day After Tomorrow," a versatile procedural system was developed to handle fast building destruction, including breakup of geomety, triggering, and animation.

Jens Zalzala
Digital Domain
jens@d2.com

Building Crowds of Unique Characters

Constructing shots with hundreds or thousands of animated, deforming, realistically shaded characters poses unique challenges. This sketch discusses the steps involved and unique solutions in Digital Domain's crowd system.

Erick Miller
Digital Domain
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Spencer Alexander
David Blumenfeld
Darren Hendler
Dave Hodgins
David Prescott
Adam Sidwell
Leonardo Szew
Manny Wong
Digital Domain

Poster Viewing

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

Sunday, 8 August - Wednesday, 11 August
8:30 am - 5:30 pm
Thursday, 12 August, 8:30 am - noon

Poster Sessions

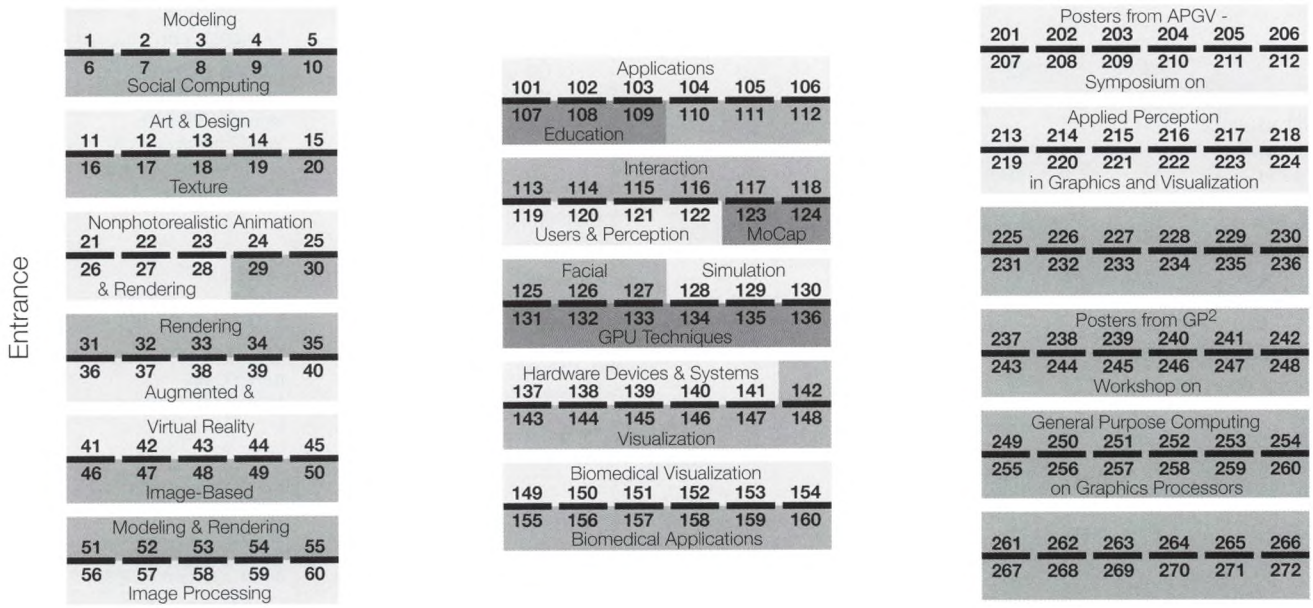
Poster authors will stand by their posters to talk with attendees and demonstrate their work during these times:

Tuesday, 10 August, 10:30 am - 12:15 pm
Wednesday, 11 August, 10:30 am - 12:15 pm

Posters

New for SIGGRAPH 2004. Poster displays of research in computer graphics and interactive techniques, including newly developing projects, smaller works, incremental or partial results, and late-breaking research.

Posters from the co-located workshops First Symposium on Applied Perception in Graphics and Visualization and GP^2: Workshop on General Purpose Computing on Graphics Processors are exhibited in West Hall A along with the SIGGRAPH 2004 Posters.



Posters Committee

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The University of Tokyo

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Nancy Pollard
Carnegie Mellon University

Jovan Popović
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Emil Praun
University of Utah

Lionel Reveret
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Morgan McGuire
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Approximate Convex Decomposition of Polyhedra
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Potential Fields and Implicit Modeling
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4
Superformula Solutions for 3D Graphic Arts and CAD/CAM
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Variational Superformula Curves for 2D and 3D Graphic Arts
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Edwin Bastiaens
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Amparo Quijano
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EmoteMail
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Gelson Reinaldo
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Michael Masucci
EZTV

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Mike Rogers
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Alicia Sanchez
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Mark Garcia
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Ethan Bromberg-Martin
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Andreas Wenger
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Bruno Rodrigues De Araujo
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Mocap+MRI=?

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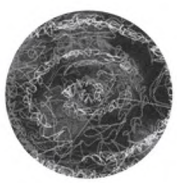

Web Graphics

Presentations and demonstrations of the year's most innovative online work. Artists, designers, producers, and programmers from around the world share their achievements in rich internet applications, web 3D, navigation, visualization, usability, motion graphics, web art, web content for handheld devices, and many more areas.

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[theMAKERS]

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Nishant Kothary
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Pratt Institute

Robert Reinhardt
Schematic

Rhonda Schauer
ACM SIGGRAPH

Wednesday, 11 August

8:30 - 10:15 am
Room 501AB

Session Chair
Snow Dowd, [theMAKERS]

Visualization

Graffiti Archaeology

An urban art time machine: a Flash-based web application that lets you explore multi-layered photo collages of graffiti-covered walls and see how they have changed over time.

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stamen.com

Electroscape 002: BAC +3 digit // multiplied space

This hybrid museum prototype is both a shared environment on the internet and a physical installation. A multi-user 3D project, it proposes a digital extension/transformation of the museum. It offers the possibility for artists to work within mixed spaces.

Christian Babski
fabric | ch

Stéphane Carion
Christophe Guignard
Patrick Keller
fabric | ch

Processing.org: Programming for Artists and Designers

A programming language and environment built for the electronic arts and visual design communities. It was created to teach the fundamentals of computer programming within a visual context and to serve as an electronic sketchbook.

Casey Reas
UCLA Design | Media Arts

Benjamin Fry
MIT Media Laboratory

10:30 am - 12:15 pm
Room 501AB

Session Chair
Robert Reinhardt, [theMAKERS]

Navigation

Ryukyu ALIVE - Information Galaxy Visualizing Users' Access Log

An information visualization system for huge web archives. Access to the archive is dynamically visualized in 3D space by analyzing a user's access log.

Akira Wakita
Keio University
wakita@sfc.keio.ac.jp

Fumio Matsumoto
Plannet Architectures

Visual Query Interfaces for Wikis and Blogs

A blog or wiki entry can include a multitude of topics, so it's challenging to fit it cleanly into a conventional hierarchical tree. This presentation summarizes the visual query interface developed to allow users to playfully explore the intersection of their interests with a wide range of content.

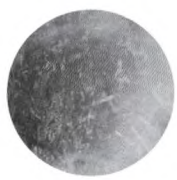
Troy Gardner
www.troyworks.com

Knowscape Mobile, Associating Territories of Data and Physical Space

An architectural space associating territories of data and physical space, linking architecture, knowledge, and browsing. This 3D multi-user experimental web browser allows visitors to interact from either physical space or the internet.

Patrick Keller
fabric | ch
patrick@fabric.ch

Christian Babski
Stéphane Carion
Christophe Guignard
fabric | ch



Wednesday, 11 August

1:45 - 3:30 pm
Room 501AB

Session Chair
Linda Lauro-Lazin, Pratt Institute

Input

NetAIBO Project

An unsimultaneous-communication and 3D-space-sharing system using web3D techniques and AIBO as the interface and a proposal for new entertainment content extended from the original function of AIBO and other stand-alone robots.

Hidenori Watanave
Photon, Inc.
derin@photon01.co.jp

Akio Fukano
Tokyo University

Tomoyoshi Saito
Most-Music Inc.

Toshiyuki Takahei
Riken

Hidenori Watanave
Photon, Inc.

Ohayo Players

A Flash-based multi-user network game based on the Japanese traditional play "Daruma-San-Ga-Koronda." Avatars move ahead in response to movement in front of the camera.

Kampei Baba
Bascule Inc.
kampei@bascule.co.jp

Jun Kitazawa
Haruyuki Imai
Yuji Nodera
Mitsuhiro Oga
Ken-ichiro Tanaka
Bascule Inc.

Flash Everywhere

Macromedia Flash is on millions of desktop systems around the world, and now it's in many new devices such as PDAs, phones, set-top boxes, console game systems, children's electronic games and more. This session showcases the many devices and offers tips and strategies for getting your content on these multiple devices.

Phillip M. Torrone
Fallon Worldwide
pt@fallon.com

3:45 - 5:30 pm
Room 501AB

Session Chair
Simon Allardice, Interface Technical Training

Mobile Web

What Graphic Designers Should Know About the Mobile Web

The newest generation of mobile phones with color screens and more powerful CPUs enables display of highly graphics-oriented web sites. However, graphic designers working on mobile web sites are faced with a number of new issues. In future, web designers will be able to use W3C's multimodal interaction technologies, where speech and handwriting recognition will replace the keyboard as primary user-input device.

Max Froumentin
Philip Hoschka
Dean Jackson
World Wide Web Consortium

JSR-226: A Versatile API for Mobile SVG on J2ME

An API for rendering and manipulating SVG Tiny content with minimal programming on J2ME/MIDP devices. The API introduces scalable graphics to MIDP devices and defines a layered architecture for various applications of SVG Tiny (as a scalable image format, animation environment, XML language).

Tolga Capin
Nokia Research Center
tolga.capin@nokia.com

Suresh Chitturi
Nokia Research Center

Thursday, 12 August

8:30 - 10:15 am
Room 501AB

Session Chair
Rhonda Schauer

X3D

Universal Converter for Platform-Independent Procedural Shaders in X3D

An XML middle-layer-based universal converter (UC) for converting shaders written in different shader languages. This technique enables sharing of different format shaders in web3D.

Feng Liu
Georgia State University
fliu1@student.gsu.edu

G. Scott Owen
Ying Zhu
Georgia State University

Rich-Media Procedural Texturing

Procedural texturing is an unexplored topic in web graphics research. Procedural textures possess remarkable properties highly suitable for 3D web-based artistic or scientific virtual environments. This research focuses on real-time image synthesis for the web.

Goncalo Nuno Moutinho de Carvalho
Cryogenic Graphics Ltd
c3099023@tees.ac.uk

10:30 am - 12:15 pm
Room 501AB

Session Chair
Nishant Kothary, Purdue University

3D

Online 3D Retrieval Based on Perceptual Quality

3D object retrieval over the internet is primarily based on best effort and maximizing quality defined by error measures such as SNR. This work presents an approach to maximizing the human perceptual quality of 3D transmissions.

Anup Basu
University of Alberta
anup@cs.ualberta.ca

Irene Cheng
University of Alberta & Zoomage Inc.

The Kata of Web3D

Large virtual spaces modeled in web3D often suffer from numerical limitations in the web3D language, software engines, and client hardware. A zero-centred approach removes these limitations.

Chris Thorne
Ping Interactive Broadband
University of Western Australia
chris.thorne@mbox.com.au

Gateway and Protocol for Modern Cyberspace

A generic cross-platform web3D cyberspace protocol that uses only standard technology and leverages the web to simplify demands on clients. The planet-earth platform is implementing this new cyberspace.

Chris Thorne
Ping Interactive Broadband
University of Western Australia
chris.thorne@mbox.com.au

Karen Haines
University of Western Australia

Thursday, 12 August

1:45 - 3:30 pm
Room 501AB

Session Chair
Simon Allardice, Interface Technical Training

Media

Generating Dynamic Web Graphics

An overview of projects that utilize web applications for dynamic generation of custom media files in raster, vector, and motion graphic formats.

Matthew Rechs
Schematic
(formerly The Content Project)
mrechs@schematic.com

Robert Reinhardt
Schematic

CSS Zen Garden

It's time to put away the nested tables, the meticulously counted colspans, and those spacer GIFs that have served you so well. The next generation of web design is here, and it's taking the world by storm. CSS Zen Garden creator Dave Shea explains the ins and outs of CSS design and shows you how you can start applying it to your work today.

Dave Shea
BrightCreative.com

3:45 - 5:30 pm
Room 501AB

Session Chair
Dean Jackson, World Wide Web Consortium

New Audiences

Flash Finally Hits Hollywood

No longer satisfied to reign as the standard in animation for the web, Flash finally powered its way into TV and films. This presentation explains how and why.

Sandro Corsaro
sandro@sandrocorsaro.com

Clifford Parrott

The Sign Language Animation Site "Hello! Astroboy"

Practical use of the Manga character in sign language animation. Understanding sign language animation is improved by using a famous character.

Manabu Yanagimoto
hit-yan@design.hitachi.co.jp

Educators Program

Content: how to teach computer graphics and develop academic resources. Continuity: computer graphics in education, from pre-school to post-graduate study. Collaboration: between art and science, educators and researchers, teachers and students, the classroom and the real world. Panels, forums, papers, and Quick Takes explore all this and more in the not-just-for-Educators Program.

Educators Program Jury

Tony Longson
SIGGRAPH 2004 Educators Program Chair
California State University, Los Angeles

Vladimir Akis
California State University, Los Angeles

Marc Barr
Middle Tennessee State University

Patricia Beckmann
SIGGRAPH 2005 Educators Program Chair
Savannah College of Art and Design

Paul Brown
University of London

John C. Finnegan
Purdue University

Lourdes Livingston
Academy of Art University

Lynn Pocock
New York Institute of Technology

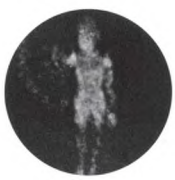
Pauline Ts'o
Rhythm & Hues Studios

Jeffery Soprano
Administrative Assistant

Teacher's Lounge

Room 503

A resource room for sitting and relaxing, networking with colleagues, browsing text books and online curriculum, sharing ideas, and meeting with presenter from the SIGGRAPH 2004 Educators Program.



Wednesday, 11 August

8:30 - 9 am
Room 502B

Ramp In

A fast overview of the Educators Program. Meet the people involved and hear the ideas behind this year's schedule.

Tony Longson
SIGGRAPH 2004 Educators Program Chair
California State University, Los Angeles

9 - 9:30 am
Room 502B Teaching Strategies

Collaboration is Key

Collaboration is a key issue in creating a climate for learning and invention using new technologies. The Cleveland Institute of Art has created the Professional Partnership Program (PPP), which allows us to stimulate the right challenge in an academic setting. One of the most satisfying results of the PPP has been an exciting collaboration between students and partners in the fields of gaming and simulations.

In order to educate students for future challenges and complex tasks, education is moving beyond the traditional classroom setting. Educational games and simulations, like Dig-In, can be used in innovative ways to help students acquire a different kind of knowledge.

This forum illustrates how collaborations among profit, non-profit, and educational organizations can improve student learning about Egyptian Art. It provides an overview of the technology used in Dig-In and summarizes the collaborative challenges of producing innovative simulations.

Jurgen Faust
Cleveland Institute of Art
jfaust@gate.cia.edu

Matt Neff
Tony Solary
Cleveland Institute of Art

Len Steinbach
Holly Witchey
Cleveland Museum of Art

9 - 10:30 am
Room 511AB Reels & Résumés

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, put your life on a one-page résumé, and showcase your talent in a three-minute-or-less demo reel. 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

9:30 - 10 am
Room 502B Teaching Strategies

Teaching Art With 3D Software

Ready for a fresh approach to teaching art? By combining traditional art methods with 3D graphics, you can create the best of both worlds. In this presentation, the author of the 3ds max 6: Visual QuickStart Guide demonstrates the potential of this powerful medium for teaching art and visualization to students of science, computer graphics, and fine art.

Michele Matossian
University of Upper Austria
3d@lightweaver.com

10 - 10:30 am
Room 502B Teaching Strategies

CoGIP: A Course on 2D Computer Graphics and Image Processing

Computer graphics is an important discipline, and it is present in almost every undergraduate computer science curriculum. Image processing is also essential to creating graphical content. 2D computer graphics and image processing have strong theoretical relationships, but in typical computer graphics courses, they are only briefly presented.

This paper proposes a course on these two discipline. Such a course is of practical interest for content creation, for acquisition of images, and for reproduction of content in different media. In addition to describing the course, the paper identifies theoretical and practical relationships between computer graphics and image processing. It identifies the benefits and drawbacks of adding such a course in an undergraduate curriculum and relates the proposed course to topics that could be part of advanced courses. Finally, it covers practical concerns such as a software framework for assignments and how to cover the main aspects in specific assignment topics.

Eric Paquette
Université du Québec
epaquette@ele.etsmtl.ca

10:30 - 11 am
Room 502B Teaching Strategies

Group Projects: Issues and Practices in Computer Graphics Technology

Group projects are used throughout the graphics and programming disciplines, and they support a continuous debate about whether the benefits overshadow the liabilities. An open discussion on how other educators have overcome these liabilities benefits all educators, novice to seasoned, who are committed to group projects. Simulating real-life experience within the group project is an optimal goal for the educator and a valuable learning tool for the student.

Jana Whittington
Purdue University Calumet
whitting@calumet.purdue.edu

K. James Nankivell
Purdue University Calumet

Wednesday, 11 August

10:30 am - 1 pm
Room 511AB **Reels & Résumés**

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
durinski@otis.edu

Stan Szymanski
Sony Pictures Imageworks

Steve Chapman
Gentle Giant Studios

Frank Gladstone
DreamWorks SKG

Toni Pace
View Studios

11 - 11:30 am
Room 502B **Teaching Strategies**

Team Teaching Animation Art and Technology

This forum reports on an interdisciplinary course entitled Animation Art and Technology, which we have taught for the past two years at Carnegie Mellon University. Faculty and teaching assistants from computer science and art team teach the class, and the students are an interdisciplinary mix. The class produces four or five animations each semester. Most of the animations have a substantive technical component, and the students are challenged to consider content innovation as equal to the technical aspects of their projects. This paper describes the structure of the class, assesses the elements that have worked well, and reviews those that still require improvement.

Jessica Hodgins
Carnegie Mellon University
jkh@cs.cmu.edu

James Duesing
Carnegie Mellon University

11:30 am - noon
Room 502B **Teaching Strategies**

The Pipeline Project: A Holistic Approach to Teaching Multimedia

The multimedia industry has embraced the integration of computer software packages. The industry recognizes that better integration and compatibility of software and hardware will produce better end results and improve workflow. In fact, many of the major software developers are now introducing suites of products.

Surely, educational establishments should follow suit and develop courses in which differing but complementary subject areas (modules) are integrated.

The main area of development at Leeds Metropolitan University has been to allow students to clearly see the aims and objectives of each module but within a more global project. Not only has this holistic approach benefited the students, it has also allowed staff to develop material that extends across modules, allows for team teaching, and integrates the lecture program. This logical approach to project work echoes the skills required in the multimedia industry.

Duncan Folley
Leeds Metropolitan University
d.folley@leedsmet.ac.uk

Simon Thomson
Stephen Parker
Nick Cope
Leeds Metropolitan University

noon - 12:30 pm
Room 502B **Teaching Strategies**

Integrating Modeling and Animation Tools Into an Introductory Computer Science Graphics Course

The current generation of college students has experienced high-quality computer animation and modeling in movies and games. However, current introductory computer graphics classes do not sufficiently address these topics. This forum summarizes our experience integrating a free modeling and animation tool into an introductory computer graphics class. The goal is to help students better understand the computer graphics development process and inspire their long-term interests in this field. The presentation includes some feedback from students.

Ying Zhu
Georgia State University
yzhu@cs.gsu.edu

G. Scott Owen
Georgia State University

1:30 - 2 pm
Room 502B **Teaching Strategies**

Developing 3D Design Education for Continuing Education and Professional Students

The purpose of this forum is analysis and re-examination of the pedagogical objectives in developing a design-education curriculum for conceptual and practical topics in 3D and visual effects. Using prior research from Theresa Amabile on creativity in managerial business practices, we theorize that these practices can be applied in conceptual understanding of teaching and developing curriculum for 3D computing. The uniqueness of this research is that it examines these practices in reference to dissemination for continuing education and professional students. Our sense is that this is an emerging market for 3D computing education in both graduate and professional studies.

The case study examines the e-21 course developed at the Harvard Extension School for continuing education students. This background gives educators and university administrators a new perspective on the complexities, achievements, and failures in developing teaching and organizational practices for this particular segment.

Adrian Mendoza
Harvard University
adrian@synthesis3.com

Colin Kegler
Harvard University

Wednesday, 11 August

1:45 - 3 pm
Room 511AB **Reels & Résumés**

Preparing Students for Job Hunting in High-End CG Industries

Schools are much better at educating students in the technical and academic skills necessary to succeed in careers in high-end computer graphics. Of course, before people can succeed in a career, they must find employment. Unfortunately, many academic institutions do not supply their students with the tools required to find that first job.

This panel addresses what those tools are and how important they are to success in obtaining employment. Topics range from researching prospective employers, what makes a winnning demo reel and résumé, self promotion, and interview and negotiation skills.

The panel includes professionals who work in these industries; recruiters, production supervisors, and executives. These are the people who decide who gets interviewed and who doesn't. They are all also actively involved in education.

Pam Hogarth
Gnomon School of Visual Effects
pam@gnomon3d.com

Debra Blanchard
DreamWorks SKG

Peter Grassi
Electronic Arts

Jeff Hazelton
BioLucid Productions

Barbara McCullough
Rhythm & Hues Studios

Kathleen Milnes
Entertainment Industry Development Corporation

Stan Szymanski
Sony Pictures Imageworks

Robin Thompkins
Electronic Arts

2 - 3 pm
Room 502B **Teaching Strategies**

The Technological Imperative in Contemporary Art and Design Studies

Todays schools of art and design (and other creative studies) are dependent upon extensive implementation of technology to support their academic missions. But the challenge of funding such implementation is daunting. Furthermore, placing computers in a room and plugging them into a wall does not constitute a meaningful approach to modern creative arts education. This distinguished panel examines the imperatives and challenges of re-designing the environment for modern creative arts programs.

Rick Barry
Pratt Institute
rick_barry@siggraph.org

Thomas Hyatt
Maryland Institute College of Art

Harry Mott
Otis College of Art & Design

Judson Rosebush
Judson Rosebush Co., Inc.

Cynthia Beth Rubin
Rhode Island School of Design

Ann Morgan Spalter
Brown University

Peter Voci
New York Institute of Technology

3 - 3:30 pm
Room 502B **Teaching Strategies**

National Science Foundation Funding for Education Projects

The National Science Foundation supports projects to improve education in science, mathematics, engineering, and technology through the Division of Undergraduate Education in EHR and programs in the research directorates such as CISE. This forum presents the requirements and guidelines for programs in these areas and includes a presentation of the characteristics of a competitive proposal, and the proposal and review processes. In the discussion forum, attendees are invited to explore project ideas with the presenter.

Steve Cunningham
National Science Foundation
rsc@cs.csustan.edu

3 - 5 pm
Room 511AB **In-House Training**

Exploring the Current State of In-House Training

This panel investigates how animation, visual effects, and gaming studios keep in-house artists on the leading edge of their craft, given the rapid growth of technology, software upgrades, new and enhanced products, innovative hardware, etc. Topics include: sharpening digital and traditional skills, the rewards and challenges of in-house training programs; the historical context of those programs, and where in-house training is going in the future.

Lourdes Livingston
Academy of Art University
llivingston@academyart.edu

Dan Chuba
Hammerhead Productions

Frank Gladstone
DreamWorks SKG

Randy Nelson
Pixar Animation Studios

Bob Nicoll
Electronic Arts

Kathleen O'Reilly
Rhythm & Hues Studios

Sande Scoredos
Sony Pictures Imageworks

Wednesday, 11 August

3:30 - 4 pm
Room 502B Teaching Strategies

CGEMS: Computer Graphics Educational Materials Source

CGEMS, the Computer Graphics Educational Materials Source, supports a worldwide community of computer graphics educators. Its goal is to provide a means for educators' work to be appraised and disseminated to other members of the community through an online server for refereed educational content.

Since it was presented at SIGGRAPH 2003 in San Diego, CGEMS has evolved into a full-fledged, peer-reviewed medium. This paper presents the current state of the server, reports on work developed and dissemination activities, and, most importantly, describes how and why educators should submit content.

Joaquim Jorge
Universidade Técnica de Lisboa

4 - 5 pm
Room 502B Teaching Strategies

Building the World-Wide Community of Graphics Educators

The fast pace of change in computer graphics (CG) makes it difficult for educators to continually design up-to-date, meaningful, and robust curricula that address the full potential of the technology. The most valuable resource for CG educators is access to an international community of like-minded people who teach digital media in all forms. This forum addresses the following issues:

- How can we build a worldwide community of computer graphics and digital media educators?
- How we can provide a method for the people involved to share information?
- How can the community collaborate to move disciplines that use digital media forward?
- How do we build a system for educators to share information, and what should it look like?
- How can the online community spur collaborations, foster creativity, and make rich connections to further the field?

Dena Eber
Bowling Green State University
deber@bgnet.bgsu.edu

Thursday, 12 August

8:30 - 8:45 am
Room 502B Interactive Education

Building The Virtual Reality Instructor

Developing virtual instructors as 3D-animated characters that behave autonomously in networked virtual environments, respond to multi-modal input across computer networks, interact with human learners using context-aware intelligence, and apply proven pedagogical techniques during instruction has the potential to provide human learning anytime, anywhere, at any pace. However, building a virtual reality instructor has challenged researchers because it requires interdisciplinary expertise in areas such as cognitive science, sociology, artificial intelligence, 3D computer graphics, linguistics, and more. This presentation discusses a model for building interactive virtual reality instructor systems more efficiently using an innovative software architecture: Joint Embedded Pedagogical Agent Architecture (JEPAA).

Jayfus T. Doswell
George Mason University
doswellj@hotmail.com

8:30 - 10 am
Room 511AB Cultural Heritage

Databases and Virtual Environments: A Good Match for Communicating Complex Cultural Sites

This paper describes development of a complex project that addresses creation of advanced systems within virtual cultural environments. The goal is to perform new kinds of interaction and create user-friendly interfaces to facilitate access to data and meta-information that exist behind the cultural objects themselves. Bologna Electronic Museum is a real-time navigation and interaction program connected to virtual worlds and multimedia databases.

Luigi Calori
CINECA
l.calori@cineca.it

Tiziano Diamanti
VISMAN Project

Mauro Felicori
Bologna City Council

Antonella Guidazzoli
CINECA

Maria Chiara Liguori
Bologna City Council

Massimo Alessio Mauri
CINECA

Sofia Pescarin
Consiglio Nazionale delle Ricerche

Luigi Valentini
CINECA

8:45 - 9 am
Room 502B Interactive Education

Teaching Beyond the Human Form

Bespace (2003) is a web3D, multi-user lecture hall that empowers teachers, and addresses both the affordances and limitations of virtual space. A synchronous, online distance-learning environment, it utilizes a standard convention of information delivery found in real environments – the multimedia slideshow. A radical shift occurs in that information is not presented on a faux projection screen within the virtual space; instead, the teacher's avatar, the wed3D representation of the teacher, transforms into the presentation. The teacher's avatar acts as a node for delivering information and literally shape-shifts into slides, interactive models, and small exploreable landscapes. This approach negates the long-standing multi-user, web3D problems of collaboration and navigation. It exploits, rather than denies, the fact that web3D is generated by lines of code and engaged via mouse and screen. Web3D is a graphic user interface (GUI). The teacher's avatar is a part of that GUI and unbound by rules of faux reality. The teacher is the presentation.

Steve Guynup
Georgia Institute of Technology
steve_guynup@hotmail.com

Ron Broglio
Jim Demmers
Georgia Institute of Technology

9 - 9:15 am
Room 502B Interactive Education

Teaching Physics by Designing Games

This presentation summarizes an experimental physics course in which students learned elementary mechanics by designing computer games. Teaching physics with simulation and animation is a very natural thing to do, and having students make computer games was a very good motivator. Choice of technology is crucial for this kind of course. We used spreadsheets, vpython, and UnrealEd. In the future, we will design course materials for use elsewhere, with the assistance of the Minneapolis College of Art and Design.

Peter Border
University of Minnesota
border@physics.umn.edu

Thursday, 12 August

9:15 - 9:30 am
Room 502B **Interactive Education**

Virtual Worlds, Cognitive Maps

This presentation explores the power of simulation building as a constructivist learning activity and develops an agenda for pursuit of research in this area. Our project gathered momentum after we observed that our animation students, who were working on modeling the behavior of foraging ants, had become quite enthusiastic and insightful about self-organizing emergent behaviors. Subsequent efforts along similar lines have led us to believe that creation of an interactive 3D simulation is a highly effective way to learn novel concepts that require new habits of mind. Note that we are recommending construction, rather than use of, a simulation to achieve these learning objectives. The act of creating one's own model requires an overall organization of the material and tests command of the details, so it demands much greater mastery of a subject than even the most thorough exploration of an existing simulation.

Steve Kurtz
Rochester Institute of Technology
shk@it.rit.edu

Nancy Doubleday
Rochester Institute of Technology

9:30 - 9:45 am
Room 502B **Interactive Education**

Immersive Visualization in K-12 Education

This presentation reviews prior research of immersive visualization technology for K-12 educational settings and discusses current research, affordable technology and effective strategies to support K-12 education with immersive displays. Open dialog is encouraged among attendees to identify and discuss challenges, solutions, and future directions. Issues discussed include: costs of immersive visualization displays, invasiveness of devices, interactivity, mobility and re-deployability of displays, selecting appropriate content applications, content development, and integration with teachers and curriculum. Also featured: current work at the University of Kentucky Center for Visualization and Virtual Environments using commodity-based, collaboratively rendered environments suitable for educational settings and diverse populations.

Derek C. Eggers
University of Kentucky
deggers@engr.uky.edu

Cindy H. Lio
University of Kentucky

Joan M. Mazur
University of Kentucky

9:45 - 10 am
Room 502B **Interactive Education**

SeaMaven: A Web-Based Virtual Learning Environment

SeaMaven is a web-based application that enables middle-school science students to actively engage in collaborative learning in the environmental sciences. The program provides students with access to a real-time observational network of platform-based sensors for monitoring oceanographic and meteorological processes. The sensor packages are mounted on eight large offshore platforms approximately 60 miles off the coast of Georgia. This system currently serves as an important resource for marine scientists, weather forecasters, and fisheries-resource managers by providing information on cross-shelf nutrient exchange, storm effects, and atmospheric transport. SeaMaven is a portal through which students can become amateur scientists in their own right, recording measurements, comparing data, and generating hypotheses based on their observations.

Jim Demmers
Georgia Institute of Technology
jim.demmers@gtri.gatech.edu

Steve Guynup
Georgia Institute of Technology

10 - 10:15 am
Room 502B **Interactive Education**

A Novel Way to Study Muscle Anatomy of the Beef Animal

In academic and industrial settings, it is difficult to teach the anatomy of a beef animal, because instruction requires a beef carcass fabricated into wholesale and retail cuts or dissection of individual muscles. This could only happen in a laboratory, and substantial cost would be incurred for each lab session. Books or manuals can assist somewhat but these are only two-dimensional, so it is difficult to understand some of the spatial relationships between muscles. It is now possible to use a web site (bovine.unl.edu) as a resource for the muscular anatomy of the beef animal. The site helps users understand bovine muscular and skeletal anatomy through interactive 3D and 2D graphics simulations, pictures, drawings, and navigation through a series of well-defined information modules.

Vishal Singh
University of Nebraska-Lincoln
singh2@unl.edu

Ashu Guru
University of Nebraska-Lincoln

Bucky L. Gwartney
National Cattlemen's Beef Association

Steven J. Jones
University of Nebraska-Lincoln

10 - 10:15 am
Room 511AB **Cultural Heritage**

Computer Visualization as a Tool for Historic Preservation and Education

This paper discusses the ability of computer visualization to address many of the common pitfalls associated with historic preservation and the study of historic sites. Often, structures of historical significance are inaccessible to a large percentage of the public, due to structural concerns, distance, or handicapped accessibility, among other reasons. Additionally, it is not economically viable to preserve all existing structures in the United States, as the 50-year mark for Historic Register status approaches for more sites. Viewing historic locations provides a tangible link to history and strengthens historical connections during the educational process. Computer visualization of historically significant buildings can enrich distance learning and first-hand experience.

Christopher P. Redmann
Drexel University
redmann@drexel.edu

10:15 - 10:30 am
Room 502B **Interactive Education**

Visualizing Alzheimer's Disease: A Classroom Collaboration of Design and Science

This paper reports on exploration of visualization techniques through interdisciplinary development of a prototype biological data visualization tool at the University of Cincinnati. Undergraduate digital design students under the combined instruction of design and scientific research faculty formed collaborative teams to develop a prototype visual-verbal web-based, dynamic information model (DISPLAY) for extracting, comparing, and manipulating biological data related to Alzheimer's Disease at various hierarchical levels and across fields of study. Although the data for the prototype display were related to Alzheimer's Disease, the project was designed to identify and explore principles and techniques applicable to the visualization of all types of biological data.

P. Mike Zender
University of Cincinnati
mzender@zender.com

Keith Crutcher
University of Cincinnati

Thursday, 12 August

10:15 - 10:30 am
Room 511AB **Cultural Heritage**

Designing the New Memory Space for Cultural Heritage

In the representation of tangible cultural objects, there is a surrounding, intangible layer that reflects the cultural context. Without particular attention to this level, any effort to exhibit these objects lacks the peculiar human dimension that is woven together with them. Interface design methods need to be developed around this key concept to provide sound intercultural learning experiences to wide audiences.

First, these methods should be used to analyze the cultural context, and then the cognitive process in the original usage mode needs to be revealed. Afterwards, a design synthesis that considers these background factors should be followed to demonstrate the life around the object via the object itself. Interface design classes with this cultural focus would also help future professionals in the field gain a wider perspective with a deeper understanding of the implications of their design on inter-cultural communications.

Ayhan Aytes
Istanbul Bilgi University
aytesay@yahoo.com

10:30 - 10:45 am
Room 511AB **Cultural Heritage**

Freedom Bound: Creating A Public Art Project

This presentation explores the process of creating digital public art with college art students. It covers collaborating among artists and across academic disciplines, partnering between K-12 teachers and college professors, involving students in public art, and balancing content and technology in the curriculum. The Freedom Bound project is an interdisciplinary collaboration about the Underground Railroad in Lycoming County, Pennsylvania by art professor Lynn Estomin, visiting artist Stephen Marc, historian Mamie Sweeting Diggs, and Lycoming College commercial design and photography students. The project consists of five large-scale digital banners that function as "moveable billboards" on local history and an interactive web site (www.lycoming.edu/underground) featuring oral history stories and original animation and photography. The banners and web site are the centerpiece of an interdisciplinary K-12 art and history curriculum currently in use in the Williamsport, Pennsylvania public schools.

Lynn Estomin
Lycoming College
estomin@lycoming.edu

11:30 - 11:45 am
Room 502B **Interactive Education**

Ratava's Line: Emergent Learning and Design Using Collaborative Virtual Worlds

Ratava's Line is an online 3D virtual-world fashion and interactive narrative project created collaboratively at the Fashion Institute of Technology in New York and Simon Fraser University in Vancouver using emergent, collaborative 2D and 3D systems. This distance-learning project, culminating in an online event in multiple remote locations, integrated three key design elements:

- Translation of original 2D fashion designs from FIT students into 3D avatar space.
- Exhibits of artwork by student and professional artists from New York and Vancouver in virtual galleries.
- Creation of an interactive narrative "fashion cyber-mystery" for online users to experience and solve in a culminating, cyber-physical event.

The overall project goal was to explore how online collaboration systems and virtual environments can be used for distance learning, fashion and virtual-worlds design, development of new marketing tools including virtual portfolios, and creation of cross-cultural online and physical events.

Steve DiPaola
Simon Fraser University
steve@dipaola.org

Daria Dorosh
Fashion Institute of Technology

Galen Brandt
Digital Space Commons

11 am - 12:15 pm
Room 511AB **Cultural Heritage**

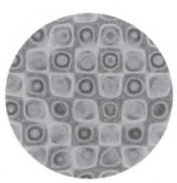
Genova 2004: A Test Bed for Industrial Design Students to Integrate Cultural Content and Information Technologies in Cross-Media Platforms

Genova, European Capital of Culture 2004, is a tantalizing occasion to stimulate students to produce content that complements the official program and to experiment with a variety of media. Students choose one of the official calendar areas (the City of Arts, the Capital of the Sea, and the Contemporary City) and create cultural products and services related to their area. They are asked to consider the wide range of communication technologies available and to implement cross-media prototypes, with attention to the integration between classic television and new communication technologies, such as the internet or mobile phones. And they are asked to design interaction so virtual communities and peer-to-peer environments can share knowledge and experience. The students are enrolled in a five-year program in industrial design at Politecnico di Milano. The course is a fourth-year, semester-long laboratory. The presentation includes video of the student work.

Maria Alberta Alberti
Università degli Studi di Milano
maria.alberti@unimi.it

Andrea Brogi
Politecnico di Milano

Paola Trapani
Università degli Studi di Milano



Thursday, 12 August

11:45 am - noon
Room 502B **Interactive Education**

Motionary: A Dictionary of Meaning in Motion

Expression of meaning in motion graphics can be accomplished by understanding metaphors used in everyday language. This paper is a report of an instructional design strategy used to apply Lakoff & Johnson's theoretical approach to metaphors of the everyday to development of metaphors for motion graphics based on typographically enhanced message design. For example, Lakoff argues that OBLIGATIONS (concept) ARE POSSESIONS and, we may add, ARE HEAVY (meta-concepts).

Metaphorical concepts like these were used to start the design process. Students were asked to research a metaphor based on everyday language and convey its meaning through motion graphics and typographic manipulation. Because of its vernacular basis, this exercise gives a glimpse of how ordinary, everyday experiences can enrich graphic design practices. Nearly 100 short animations were compiled and turned into a web site entitled Motionary, a dictionary of meaning in motion.

Petronio A. Bendito
Purdue University
pbendito@purdue.edu

noon - 12:15 pm
Room 502B **Interactive Education**

Animation of Mathematical Concepts Using Polynomiography

This paper demonstrates how a medium called "polynomiography," which consists of techniques for visualization of polynomial equations, can be used to animate mathematical concepts, provide a valuable tool for education, and visualize the following topics: Voronoi regions of points in the plane, multiplication of complex numbers and their interpretation as rotation, sensitivity of polynomial roots as coefficients change, visualization of classes of special polynomial equations arising from two problems of the American Mathematical Monthly, and animation for the sake of visual art. Web links to the corresponding animations are available, where they can be accessed for educational purposes and will be upgraded and expanded from time to time.

Bahman Kalantari
Rutgers University
kalantar@cs.rutgers.edu

Iraj Kalantari
Western Illinois University

Fedor Andreev
Western Illinois University

1:30 - 2:30 pm
Room 502B **New Approaches**

Ray Tracing in the Age of Renaissance

With the advancements in scientific measurement devices during the Renaissance, artists such as Michelangelo and Leonardo da Vinci could validate their own artistic creations with accurate dimensions and data. Computers have added a similar opportunity to the repertoire of today's artists. No longer just an observer, the artist of today is also a technician, in the same manner as da Vinci was an artist and scientist. By examining the principles and techniques of painting developed by Leonardo da Vinci, and comparing them to functions within popular computer graphics applications, this paper demonstrates a strong correlation between the techniques of Renaissance art and computer graphics tools of today. In particular: three-dimensional variables that define depth and distance in the environment, linear perspective, aerial perspective, and color relationships. These three techniques defined by Leonardo da Vinci are applicable to modern computer graphics imagery, using the functionality of Maya (Alias) as the reference.

William Chapman
Georgia State University
Turner Entertainment Group
bill.chapman@turner.com

1:30 - 3:30 pm
Room 511AB **Cultural Heritage**

Using Computer Graphics in Archaeology: A Struggle for Educative Science or to Educate Science?

As in many other scientific endeavours, computer graphics technologies are widely used in archaeology. However, a large gap still seems to exist between glamorous CG projects intended for a wider audience (generally rejected by the scientific community) and hard-core survey programs (day-to-day, in-the-field use of CG). This reveals a difficult question: Is the use of CG dangerous in itself in archaeological communication, or is it simply difficult to communicate in a nuanced way? As usual, the answer might lie in between: CG can be used wisely while playing the communication game, taking advantage of the many layers of knowledge that can be embedded in a computer model and its multiple and diverse educative possibilities.

Alan Chalmers
University of Bristol
Alan.Chalmers@bristol.ac.uk

Kevin Cain
Insight San Francisco

2:30 - 3:30 pm
Room 502B **New Approaches**

Virtual Photography: A Framework for Teaching Image Synthesis

The camera has long served as a metaphor for teaching three-dimensional graphics in introductory computer graphics courses. We extend this metaphor to include the complete photographic pipeline as a framework for teaching image synthesis in a second graphics course. We present the correspondence between photographic processes and the areas of study in image synthesis, and discuss the success of using this framework in an image synthesis course at Rochester Institute of Technology for the past two years.

Joe Geigel
Rochester Institute of Technology
jmg@cs.rit.edu

Nan C. Schaller
Rochester Institute of Technology

3:30 - 4:30 pm
Room 502B **Cultural Heritage**

Summoning the Ghosts of Globalization: Using Invention & Immersion to Teach About Media, Image, and Culture

At California Polytechnic State University, a team of two professors and their students have designed a device called the CompuObscura, a device that updates the idea of the camera obscura. The CompuObscura peers directly into the real but invisible world of moving images that surrounds us on the internet, on movie theater screens, and television and computer networking signals. The CompuObscura provides a pinprick view of that world, squeezed down through the focusing lens of the system's software and hardware, then projected on a wall inside the device, where viewers can interact with the ghost-like images that appear.

The presenters solicit suggestions for additions to this technology-development project and discuss how to make technology design and construction a vital part of teaching about the influence of media on culture and communication.

David Gillette
California Polytechnic State University
ddgillet@calpoly.edu

Enrica Lovaglio
California Polytechnic State University

Thursday, 12 August

3:30 - 5 pm
Room 511AB **Cultural Heritage**

The Computer Arts: Origins and Contexts

This session describes the AHRB-funded CACHe (Computer Arts, Contexts, Histories, etc.) project at Birkbeck College, University of London and refers to other similar projects worldwide. The early period of computer arts (1960-1980) is a poorly documented and contextualised period of art history, and it is important that this history is recorded. Many people working in education are unaware of these origins, and many reiterations of the wheel result.

Paul Brown
University of London
paul@paul-brown.com

4:30 - 5:30 pm
Room 502B

Ramp Out

Sponsored by the ACM SIGGRAPH Education Committee, summarizes on-going initiatives in computer graphics education and invites you to get involved.

Art Gallery
Concourse Foyer, Room 153A

Artist Round Tables
Room 404AB

Artist Papers
Room 404AB

Days & Hours

Sunday, 8 August	1 - 6 pm
Monday, 9 August	9 am - 6 pm
Tuesday, 10 August	9 am - 6 pm
Wednesday, 11 August	9 am - 6 pm
Thursday, 12 August	9 am - 5 pm

Art Gallery: Synaesthesia

Original digital art that emerges from the conjunction of cybernetics and human vision to help us re-experience, re-examine, and make sense of our bodies, our technologies, and our culture. Synaesthesia features visionary work in every field of digital art: 2D, 3D, interactive techniques, installations, virtual reality, multimedia, telecommunications, web art, and animation.

Art Gallery Juries

2D & 3D Works Jury
Paul Brown
University of London

Jeremy Gardiner
Thames Valley University

Kathy Rae Huffman
Cornerhouse

Gerfried Stocker
Ars Electronica

Evelyn Wilson
The Hospital Festival

Screen-Based Works Jury
Karel Dudesek
Ravensbourne College of Design and Communication

George Fiefield
Boston Cyberarts Festival

Midori Kitagawa
The Ohio State University

Ivan Pope
Freelance Artist

Anthony Rowe
squidsoup.org

Papers Jury
Roy Ascott
University of Plymouth

Colin Beardon
University of Waikato

Bill Hill
Jacksonville University

Patrick Lichty
Intelligent Agent

Art Gallery Committee

Sue Gollifer
SIGGRAPH 2004 Art Gallery Chair
University of Brighton

Alice Ross
Assistant to Chair
1 Giant Leap

Roy Ascott
University of Plymouth

Rick Barry
Pratt Institute

Tracy Colby
Otis College of Art & Design

Madge Gleeson
Western Washington University

Linda Lauro-Lazin
SIGGRAPH 2005 Art Gallery Chair
Pratt Institute

Karla Loring
Museum of Contemporary Art Chicago

Bonnie Mitchell
Bowling Green State University

Ruth West
University of California, Los Angeles
University of California, San Diego
Center for Research in Computing and the Arts

2D & 3D Works

- j604
  David Anderson
  dave@digital-lighthouse.com

- Voice
  Kerry John Andrews
  kja@p-o.co.uk

- Eyes in Motion I
  Steffi Beckhaus
  Universität Hamburg
  steffi@beckhaus.de

- BODY OF WATER
  Derek Besant
  Iconographics International
  besantd@telus.net

- MOVEMENT3
- MOVEMENT4
  Alain Bittler
  alain.bittler@wanadoo.fr

- Texola
- Relics of the Past
  Steven Bleicher
  Art Institute of Fort Lauderdale
  stbleicher@aol.com

- The Universal Whistling Machine
  Marc Böhlen/Jt Rinker
  University at Buffalo
  marcbohlen@acm.org

- Geo_04
- Shoal_01
  Keith Brown
  Manchester Institute for Research & Innovation in Art & Design
  cyberform@ntlworld.com

- Tortuosity #37
  Sheriann Ki Sun Burnham
  kisun@earthlink.net

- The "Last" clock: 14:25:18 pm, South Kensington
  Ross Cooper/Jussi Ängeslevä
  restudios
  ross@rcstudios.com

- Trying to Thinking
- Estate
  Greg Daville
  art@gallery-daville.co.uk

- Bird_facing_left
- Ohne_Titel
- Kreise_7.3sc
- SD_1084-1
  Hans Dehlinger
  Universität Kassel
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- Plays Well With Others
  Daria Dorosh
  Fashion Institute of Technology
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- X and Y (number 2)
- X and Y (number 5)
  Anna Dumitriu
  Phoenix Arts Association
  annadumitriu@hotmail.com

- Broadway One
  Ernest Edmonds/Mark Fell
  University of Technology, Sydney
  ernest@ernestedmonds.com

- What if it happened here?
  Elsi Vassdal Ellis
  Western Washington University
  eve@cc.wwu.edu

- The Labyrinth
- The Labyrinth & The Goddess
  Annika Erixån
  University of Gävle
  aea@hig.se

- [ineffable]
  Mary Flanagan
  University of Oregon
  mary@maryflanagan.com

- Golden Child #3
  Fred Fleisher
  fred.fleisher@metmuseum.org

- Decline & Fall
  Gregory Garvey
  Quinnipiac University
  greg.garvey@quinnipiac.edu

- Poetics of Migration #1
- Poetics of Migration # 2
  Phillip George
  philg@netspace.net.au

- seri_A_G1
- seri_B_A1
- seri_C_D1
  Floyd Gillis
  fgillis@afcg.com

- Word Power
  Albert Girós
  albert_giros@terra.es

- Dusk of Shattered Icons
- The Mist of Spider City
  Quintin Gonzalez
  University of Colorado at Denver
  qgonzale@carbon.cudenver.edu

- Commute
  Gene Greger
  gene@world.std.com

- Solar Self Portrait
  Jeffrey Guhde
  Cleveland Institute of Art
  jguhde@hotmail.com

- Sparkle Sea
- Yellow Boat
  Peter Hardie
  peterh@bournemouth.ac.uk

- Leap of Faith
- Acrobats
  Mellissa Harshman
  University of Georgia
  mharshma@uga.edu

- Still plotting after all those years ...
  Jean-Pierre Hébert
  University of California, Santa Barbara
  jph@impulse.net

- Transport IX
  Eric Heller
  Harvard University
  heller@physics.harvard.edu

- Orai/Kalos
  Paul Hertz
  Northwestern University
  paul-hertz@northwestern.edu

- The Appearance of Cerebration
  Adi Hoesle
  adi@vr-web.de

- 2003.4a and 2003.4b
  Kenneth A. Huff
  ken@itgoesboing.com

- Miscommunication
  Byeong Sam Jeon
  bjeon@artic.edu

- CORE-CELL Tower
  Yoichiro Kawaguchi
  The University of Tokyo
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- Meditation
  Taehee Kim
  Southern University
  tkim4@lsu.edu

- Vanitas No. 23
  Viktor Koen
  viktor@viktorkoen.com

- Touch the drop
  Kumiko Kushiyama
  Musashino Art University
  kushi@ea.mbn.or.jp

- Emailing With Grace
  Linda Lauro-Lazin
  Pratt Institute
  llaurola@pratt.edu

- Observational Drawings - Hand
  Liz Lee
  SUNY Fredonia
  elizabeth.lee@fredonia.edu

- Portraits in 8 Bits or Less
- Encoder Study - 1992-2003
  Patrick Lichty
  Intelligent Agent
  voyd@voyd.com

- Art from Ephemeral Scientific Moments: "Horizonte"
  Santiago V. Lombeyda
  California Institute of Technology
  slombey@caltech.edu

- Ocean and Stones
  Juliet Ann Martin
  Pace University
  girl@julietmartin.com

- Entrapment
  Bonnie Mitchell
  Bowling Green State University
  bonniem@creativity.bgsu.edu

- Autumn's Egress
- Transmigratory Summation
  Kent Oberheu
  k_oberheu@semafore.com

- Re:Anjyu
  Yasuo Ohba
  NAMCO Limited
  ohba@rd.namco.co.jp

- A Hundred Unfolded Sighs
  Joohyun Pyune
  Paramount Art
  paramountart@aol.com

- O.S. form no.1,9,2,10
  Julie Read
  Edinburgh College of Art
  julie@julieread.co.uk

- MicroImage
  Casey Reas
  Interaction Design Institute
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- Layered Histories
  Cynthia Beth Rubin & Bob Gluck
  Rhode Island School of Design
  info@cbrubin.net

- Deflection 1
  Xenophon Sachinis
  Aristotle University of Thessaloniki
  xenisax@vis.auth.gr

- Polloi
  Philip Sanders
  The College of New Jersey
  ps@thing.net

Screen-Based Works

- All This Useless Beauty
  Anthony Santoro
  Curious Pictures/Purchase College,
  State University of New York
  anthony.luigi@verizon.net

- Volution's Evolution
  Carlo Séquin
  University of California, Berkeley
  sequin@cs.berkeley.edu

- Poxville
- Worley Basin
  Dylan Sisson
  Pixar Animation Studios
  dsisson@pixar.com

- Kitchen Sensation
  Kathi Stertzig
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- Red streamlines
  Mark Stock
  University of Michigan
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- Split Brooch
- Written Brooch
  Rebecca Strzelec
  Penns State Altoona
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- Noise Control
- Pitch and Volume
  Anna Ursyn
  University of Northern Colorado
  ursyn@unco.edu

- Audio Printer
  Eva Verhoeven
  Wimbeldon School of Art
  eva@whateva.org.uk

- Twenty-six Visions of Hildegarde
- Gaia Triptych
- Cyberflower # VII
  Roman Verostko
  Pathway Studio
  rv@verostko.com

- The Song of the Revolving Drawing Frog, Greenwood Road
  James Faure Walker
  Kingston University
  james@faurewalker.demon.co.uk

- ziggi 1
  Philip Wetton
  pmwetton@mail.ctg.net

- Stop Motion Studies - Tokyo
  David Crawford
  crawford@stopmotionstudies.net

- Electric Sheep
  Scott Draves
  spot@draves.org

- Leif Codices
  Jorn Ebner
  Newcastle University
  j.ebner@britishlibrary.net

- Metamorphosis
  Anthony Head
  London College of Music and Media
  anthony@cockneydog.com

- Number in I-Ching
  Junghoon Lim
  Kookmin University
  waterlov@studiohoon.com

- Views from the ground floor ...
  Jessica Loseby
  jess@rssgallery.com

- Virtual and Real: K-Dron and Light
  Przemyslaw Moskal
  moskal@laksom.com

- genomixer ..
  stanza
  stanza@sublime.net

- adjusted daydreams
  Stefanie Vandendriessche
  stefanie@atmsferik.com

- Life Support
  Annette Weintraub
  City College of New York
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- Habitat Perspectives
  Marcos Weskamp
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- Disembodied Voices
  Jody Zellen
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- Adam001
  Yuli Ziv
  NetArt
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- WEB3DART 2004
  Karel Dudesek
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Animations

- The Three Graces
  Andreas Berner
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- Living Canvas
  Jimmy Chim
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- Amazilia
  Brian Evans
  University of Alabama
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- Life in the Square
  Matthias Goetzelmann
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- Light On Water
  Peter Hardie
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- Nichigraphs
  Junko Hoshizawa Sedlak
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- Inaudible Cities: Part One
  Semiconductor
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- Collaborating By Numbers
  Lise-Helene Larin
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- (re)cognition
  Stephan Larson
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- Voice of Whale
  Heebok Lee
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- Superimposing Form Upon Chaos
  Vivek Patel
  Florida Atlantic University
  vpatel@vivekpatel.info
- BLUE - 2004
  Peter Petersen
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- Layered Histories: the Wandering Bible of Marseilles
  Cynthia Beth Rubin
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- MICROCOSM
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Performance

Wednesday, 11 August, 5:30 - 6:30 pm
Art Gallery, Concourse Foyer

Guinevere's Globe

SMARTlab, BBC, Media Lab Europe, KILA, ArcScience. FIT, and Natural5th present a synaesthetic (scent, music, movement) short film, projected in the round on the Omniglobe system.

Artist Round Tables

Sunday, 8 August, 10:30 am - 12:15 pm
Room 404AB

Researching the Future: (CAiiA-STAR and the Planetary Collegium)

Taking the Planetary Collegium as their starting point, the panelists address research issues as they relate to the development of practice and theory in the context of collaborative criticism and inquiry across a wide field of knowledge and experience.

Roy Ascott (Chair)
University of Plymouth

Donna Cox
University of Illinois at Urbana-Champaign

Margaret Dolinsky
Indiana University

Diane Gromala
Georgia Institute of Technology

Marcos Novak
University of California, Santa Barbara

Miroslaw Rogala

Thecla Schiphorst
Simon Fraser University

Diana Slattery
Rensselaer Polytechnic Institute

Victoria Vesna
University of California, Los Angeles

Sunday, 8 August, 3:45 - 5:30 pm
Room 404AB

Ars Electronica: 25 Years of the Digital Avant-Garde

Celebrating 25 years of Ars Electronica. The panel provides not just interesting historical information, but also comprehensive insight into new directions of digital art.

Roy Ascott (Chair)
University of Plymouth

Christine Schöpf
Gerfried Stocker
Ars Electronica

Karel Dudesek
Ravensbourne College of Design

Michael Naimark
New York University

Barbara Robertson

Monday, 9 August, 3:45 - 5:30 pm
Room 404AB

Synaesthesia

This panel discusses synesthesia, which typically involves sensory crossover among the basic senses (vision, hearing, taste, smell, and touch) within the normal range of sensation.

Roy Ascott (Chair)
University of Plymouth

Donna Cox
University of Illinois at Urbana-Champaign

Margaret Dolinsky
Indiana University

Diane Gromala
Georgia Institute of Technology

Marcos Novak
University of California, Santa Barbara

Diane Gromala
Georgia Institute of Technology

Miroslaw Rogala

Thecla Schiphorst
Simon Fraser University

Victoria Vesna
University of California, Los Angeles

Papers

1:45 - 3:30 pm
Room 404AB

Session Chair
Roy Ascott, University of Plymouth

The Kitchen as a Graphical User Interface

An augmented residential kitchen "painted" throughout with digital information to orient and inform multiple users in the tasks of cooking, cleaning, and socializing.

Leonardo Bonanni & Chia-Hsun Lee
Massachusetts Institute of Technology

Sensational Technologies

The use of state-of-the-art technology in installations and performances that trigger the senses to create a sensorial or synaesthetic experience.

Annet Dekker
The Netherlands Media Art Institute

Vivian van Saaze
Maastricht University
Netherlands Institute for Cultural Heritage

Audio/Visual Discourse in Digital Art

Art systems that employ image and sound as equal elements. Very different examples studied in an artist-in-residence research project illustrate the argument.

Ernest Edmonds/Sandra Pauletto
University of Technology, Sydney

3:45 - 5:30 pm
Room 404AB

Session Chair
Roy Ascott, University of Plymouth

The Noetic Connection: Synesthesia, Psychedelics, and Language

Synesthesias, psychedelic experience, and language, highlighting Terence McKenna's hyperdimensional language experiences on DMT and the complexities of intertwingulating visual, sonic, and linguistic systems with the Synestheater performance software.

Diana Slattery
Rensselaer Polytechnic Institute

Interface as Image: Image Making and Mixed Reality

Exploration of the graphical user interface as art, product, and inspiration, drawing on Gwilt's own practice as an image-maker and installation artist, and a theoretical investigation of digital image making in hybrid art practice.

Ian Gwilt
University of Technology, Sydney
ian.gwilt@uts.edu.au

Thoughts on Hesse, Digital Art, and Visual Music

Exploration of the ideas put forth in Hermann Hesse's novel *Magister Ludi (The Glass Bead Game)* in the context of digital art, visual music, and interactive sound sculptures.

Bruce Wands
School of Visual Arts

Artists Talks

Sunday, 8 August, 1:45 - 3:30 pm
Art Gallery, Concourse Foyer

Yuli Ziv
NetArt

Peter Peterson

Annika Erixån
University of Gåvle

Anthony Head
London College of Music and Media

Wednesday, 11 August, 12:30 - 1:30 pm
Art Gallery, Concourse Foyer

The Globe as a Metaphor for Art

Art in transition from its traditional place in culture to a future vision of inclusiveness and opportunity for collaboration through the power of digital tools.

Daria Dorosh
Fashion Institute of Technology

Wednesday, 11 August, 1:45 - 3:30 pm
Art Gallery, Concourse Foyer

Kenneth A. Huff

Rebecca Strezelca
Pennsylvania State University, Altoona

Jorn Ebner

Wednesday, 11 August, 3:45 - 5:30 pm
Room 404AB

Art and Nature

An illustrated discussion of subjects such as early inspirations, connections to SIGGRAPH, the relationship between nature and digital art, the multimedia nature of digital art, and the artistic process.

David Em

Yoichiro Kawaguchi
The University of Tokyo

Thursday, 12 August, 1:45 - 3:30 pm
Art Gallery, Concourse Foyer

Philip Sanders
College of New Jersey

Cynthia Beth Rubin & Bob Gluck
Rhode Island School of Design

Maria Wiener

Matthias Gotzelmann

Computer Animation Festival

The world's most innovative, imaginative works in computer graphics and interactive techniques: animation, visualization, simulation, visual effects, and technical imagery produced by adventurers who blend art and science into unique visual experiences. The Computer Animation Festival jury presents selected works in the Electronic Theater (matinée and evening shows) and the Animation Theater (throughout the week).

Computer Animation Festival Committee

Chris Bregler
SIGGRAPH 2004 Computer Animation Festival Chair
New York University

Kevin Feeley
Co-Producer
New York University

Clilly Castiglia
Co-Producer
New York University

Sally Rosenthal
New York University

Evelyn Rivera
Video Editor
HBO Studio Productions

Ladd McPartland
Film Editor
Digital Dharma

Anezka Sebek
Animation Theater Director
Parsons School of Design, New School University

Debbi Baum
Associate Producer
New York University

Jessica DeVincenzo
Project Manager

Isaac Kerlow

Samuel Lord Black
SIGGRAPH 2005 Computer Animation Festival Chair
Pixar Animation Studios

Daniel Durning
Outreach Director
New York Institute of Technology

Peter Weishar
Savannah College of Art and Design

Computer Animation Festival Jury

Paul Debevec
USC Institute for Creative Technologies

Shuzo John Shiota
Polygon Pictures

Darin Grant
Digital Domain

Boo Wong
Curious Pictures

Christine Schöpf
ORF and Ars Electronica

Ines Hardtke
National Film Board of Canada

Sue Gollifer
University of Brighton

Samuel Lord Black
Alternate Juror
Pixar Animation Studios

Anezka Sebek
Alternate Juror
Parsons School of Design, New School University

Electronic Theater

Location	Hall K
Monday, 9 August	7 - 9 pm
Tuesday, 10 August	1:30 - 3:30 pm, 7 - 9 pm
Wednesday, 11 August	1:30 - 3:30 pm, 7 - 9 pm

Animation Theater

Location	Room 409AB and 411
Sunday, 8 August	1 - 6 pm
Monday, 9 August	9 am - 6 pm
Tuesday, 10 August	9 am - 6 pm
Wednesday, 11 August	9 am - 6 pm
Thursday, 12 August	9 am - 5 pm

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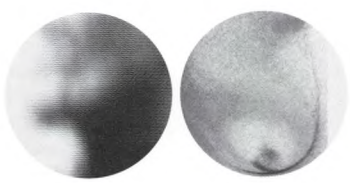
Special Showing

Meet the Artist: RYAN "Jury Award" by Chris Landreth
Electronic Theater/Hall K
Wednesday, 11 August
4 - 5 pm

This special showing of "RYAN" is open to all SIGGRAPH 2004 attendees.



Animation Theater Schedule

Room 411

Sunday, 8 August

1 - 2 pm
Paraphernalia

2:15 - 3:15 pm
Commercials and Visual Effects

3:30 - 4:30 pm
Paraphernalia

4:45 - 5:45 pm
Commercials and Visual Effects

Monday, 9 August

9 - 10 am
Paraphernalia

10:15 - 11:15 am
Commercials and Visual Effects

11:30 am - 12:30 pm
Paraphernalia

12:45 - 1:30 pm
Meet the Artist: Schools

2 - 3 pm
Commercials and Visual Effects

3:15 - 4:15 pm
Paraphernalia

4:30 - 5:30 pm
Commercials and Visual Effects

Tuesday, 10 August

9 - 10 am
Paraphernalia

10:15 - 11:15 am
Commercials and Visual Effects

11:30 am - 12:30 pm
Paraphernalia

12:45 - 1:30 pm
Meet the Artist: Studios

2 - 3 pm
Commercials and Visual Effects

3:15 - 4:15 pm
Paraphernalia

4:30 - 5:30 pm
Commercials and Visual Effects

Wednesday, 11 August

9 - 10 am
Paraphernalia

10:15 - 11:15 am
Commercials and Visual Effects

11:30 am - 12:30 pm
Paraphernalia

12:45 - 1:30 pm
Meet the Artist: Birthday Boy "Best Animated Short Award"

2 - 3 pm
Commercials and Visual Effects

3:15 - 4:15 pm
Paraphernalia

4:30 - 5:30 pm
Commercials and Visual Effects

Thursday, 12 August

9 - 10 am
Paraphernalia

10:15 - 11:15 am
Commercials and Visual Effects

11:30 am - 12:30 pm
Paraphernalia

12:45 - 1:30 pm
Meet the Artist: Japanese Media Arts Festival Screening

2 - 3 pm
Commercials and Visual Effects

3:15 - 4:15 pm
Paraphernalia

4:30 - 5:30 pm
Commercials and Visual Effects

Room 409AB

Sunday, 8 August

1 - 2 pm
Twisted

2:15 - 3:15 pm
Magic

3:30 - 4:30 pm
Twisted

4:45 - 5:45 pm
Magic

Monday, 9 August

9 - 10 am
Twisted

10:15 - 11:15 am
Magic

11:30 am - 12:30 pm
Twisted

2 - 3 pm
Magic

3:15 - 4:15 pm
Twisted

4:30 - 5:30 pm
Magic

Tuesday, 10 August

9 - 10 am
Twisted

10:15 - 11:15 am
Magic

11:30 am - 12:30 pm
Twisted

2 - 3 pm
Magic

3:15 - 4:15 pm
Twisted

4:30 - 5:30 pm
Magic

Wednesday, 11 August

9 - 10 am
Twisted

10:15 - 11:15 am
Magic

11:30 am - 12:30 pm
Twisted

2 - 3 pm
Magic

3:15 - 4:15 pm
Twisted

4:30 - 5:30 pm
Magic

Thursday, 12 August

9 - 10 am
Twisted

10:15 - 11:15 am
Magic

11:30 am - 12:30 pm
Twisted

2 - 3 pm
Magic

3:15 - 4:15 pm
Twisted

4:30 - 5:30 pm
Magic

Animation Theater

- 1may
  Director and Contact: Daniel Zdunczyk
  virtual magic
  virtualmagic@virtualmagic.com.pl

- 3 Phasen
  Director: Daniel Holzwarth
  Contact: Thomas Haegele
  Filmakademie Baden-Württemberg
  animationsinstitut@filmakademie.de

- Annie & Boo
  (Full version. Short version is shown in Electronic Theater.)
  Director: Johannes Weiland
  Contact: Michael Schaefer
  Filmakademie Baden-Württemberg
  animationsinstitut@filmakademie.de

- Anthem
  Directors: Kylie Matulick, Todd Mueller
  Contact: Justin Booth-Clibborn
  PsyopTV
  justin@psyop.tv

- Autoglass "Cracks Catch Up With You"
  Director: Daniel Levi
  Contact: Charlotte Williams
  Glassworks
  charlotte@glassworks.co.uk

- The Balloon
  Director and Contact: Bum-Jin Lee
  Ringling School of Art and Design
  blee@ringling.edu

- BMW X3: "Any"
  Director: Paul Street
  Contact: Matt Winkel
  Digital Domain
  mwinkel@d2.com

- Cécile sans paupières
  Directors: Manuel Ferrari, Daniel Garnerone, Johan Gay, Sandrine Lurde
  Contact: César Volaire
  One Plus One
  david@oneplusone.fr

- Dahucapra Rupidahu
  Directors: F. Gyuran, V. Gautier, T. Berard
  Contact: César Volaire
  One Plus One
  david@oneplusone.fr

- De Huisspitsmuis
  Director: Ben Toogood
  Contact: Anargyros Sarafopoulos
  Bournemouth University
  asarafop@bournemouth.ac.uk

- Dear, Sweet Emma
  Director: John M. Cernak
  Contact: Loraine Cernak
  Out of Our Minds Animation Studios, Inc.
  lori@outofourmindsstudios.com

- DIGITALSNAPSHOT: Minute Manipulations of Space, Place, and Time
  Director and Contact: Daniel Lo Iacono
  info@digitalsnapshot.de

- Drift
  Directors: Kylie Matulick, Todd Mueller
  Contact: Justin Booth-Clibborn
  Psyop TV
  justin@psyop.tv

- Eiu esperu
  Directors: Damien Stumpf, Mickaël Lorenzi
  Contact: César Volaire
  One Plus One
  david@oneplusone.fr

- El Desván
  (Full version. Short version is shown in Electronic Theater.)
  Director: José Corral
  Contact: Montxo Algora
  Artfutura
  artfutura@artfutura.org

- ESPN "Evolution"
  Director: Motion Theory
  Contact: Javier Jimenez
  Motion Theory
  javier@motiontheory.com

- The Fall
  Director and Contact: James Willingham
  Ringling School of Art and Design
  jwilling@rsad.edu

- First Life
  Director and Contact: John Bair
  Edgeworx
  john@edgeworx.com

- Fortune Teller
  Director and Contact: Sung Chung
  Ringling School of Art and Design
  schung@ringling.edu

- Frank
  (Full version. Short version is shown in Electronic Theater.)
  Director and Contact: Taruto Fuyama
  fuyan@taruto.com

- Gala Bingo: Spiders
  Director: Traktor
  Contact: Sophie Trainor
  The Moving Picture Company
  sophie-t@moving-picture.com

- The GOD
  Director: Konstantin Bronzit
  Contact: Alexander Boyarsky
  info@melnitsa.com

- Hairy & Scary
  Director: Jan Van Rijsselberge
  Contact: Victor Wong Wang Tat
  Menfond Electronic Art & Computer Design Co. Ltd.
  victor@menfond.com

- The Haunted Mansion
  Director: Rob Minkoff
  Contact: Jerome Schmitz
  Sony Pictures Imageworks
  jschmitz@sonypictures.com

- I'm Walking
  Director: The Soulcage Department
  Contact: The Soulcage Department
  The Soulcage Department
  elm@soulcage-department.de

- Inseparable Bonds
  Director and Contact: Lars Magnus Holmgren
  Frankenskippy
  doctor@frankenskippy.com

- Japan
  Director: Nobuo Takahashi
  Contact: Naoki Hashimoto
  Yoshida Gakuen
  hasimoto@yoshida-g.ac.jp

- Kitaro The Movie
  Director: Tatsuya Nagamine
  Contact: Tokazu Hattori
  Toei Animation Co., Ltd.
  hattori@toei-anim.co.jp

- Louis
  Directors: Olivier Barre, Nicolas Bruchet, Samuel Devynck
  Contact: César Volaire
  One Plus One
  david@oneplusone.fr

- Mandible Reconstruction Project
  Director and Contact: Benjamin Grosser
  University of Illinois at Urbana-Champaign
  Beckman Institute
  grosser@uiuc.edu

- Man's First Friend
  Director: Allen Mezquida
  Contact: Tony Maki
  tony@anihaus.com

- Massive Arabesque
  Director: Jim Berry
  Contact: C. Lawrence Zitnick
  Microsoft Research
  larryz@microsoft.com

- MICROCOSM
  Director and Contact: Joe Takayama
  Kyushu University
  joe@designer.so-net.ne.jp

- My Grandpa
  Director and Contact: Petr Marek
  demaris@centrum.cz

- Nike "Presto 04"
  Director: Motion Theory
  Contact: Javier Jimenez
  Motion Theory
  javier@motiontheory.com

Animation Theater

tara@doubleecomms.com

- Nike "Speed Chain"
  Director: David Fincher
  Contact: Matt Winkel
  Digital Domain
  mwinkel@d2.com

- no limits
  Director: Heidi Wittlinger
  Contact: Thomas Haegele
  Filmakademie Baden-Württemberg
  animationsinstitut@filmakademie.de

- Oddworld Stranger CG Intro
  Director: Lorne Lanning
  Contact: Jenny Shaheen
  Oddworld Inhabitants
  jenny@oddworld.com

- Offspring "Hit That"
  Directors: John Williams, David Lea
  Contact: Joanna Stevens
  Passion Pictures
  joanna@passion-pictures.com

- Otsu
  Directors: Lucas Vallerie, Mathieu Gastaldi, Sylvain Crombet
  Contact: César Volaire
  One Plus One
  david@oneplusone.fr

- The Painter
  Director: Andy Power
  Contact: Rycharde Hawkes
  Hewlett-Packard Laboratories
  rycharde.hawkes@hp.com

- Pfffirate
  Directors: Xavier Andre, Guillaume Herent
  Contact: César Volaire
  One Plus One
  david@oneplusone.fr

- The Pier
  Director and Contact: Jason Bennett
  Ringling School of Art and Design
  jbennett@rsad.edu

- The Presentators Cake
  Director: Stefan Marjoram
  Contact: Sarah Hodson
  Aardman Animations
  sarah.hodson@aardman.com

- Quelqu'un d'autre
  Directors: F. Bosz, J.C. Kerninon, B. Masse, B. Van Opstal
  Contact: César Volaire
  One Plus One
  david@oneplusone.fr

- Riba
  Directors: Yves Dalbiez, Elise Garcette, Laurent Leleu
  Contact: César Volaire
  One Plus One
  david@oneplusone.fr

- Rockfish
  (Full version. Short version is shown in Electronic Theater.)
  Director: Tim Miller
  Contact: Jamie Breuer
  Artisans PR
  jbreuer@artisanspr.com

- Ruby: The DoubleCross
  Director: Harry Dorrington
  Contact: Callan McInally
  ATI Technologies Inc.
  callan@ati.com

- Ryan
  (Full version. Short version is shown in Electronic Theater.)
  Director: Chris Landreth
  Contact: Hélène Tanguay
  National Film Board of Canada
  h.tanguay@nfb.ca

- The Site
  Director: Etienne Lastennet
  Contact: Sabrina de los Rios
  Vancouver Film School
  sabrina@vfs.com

- Sucker
  Director and Contact: Ellen Brenner
  University of California, Los Angeles
  herbalworm@aol.com

- Tetra Pak: Forests
  Director: Frederic Planchon
  Contact: Sophie Trainor
  The Moving Picture Company
  sophie-t@moving-picture.com

- Tippett Studio Creates Machine City in "The Matrix Revolutions"
  Directors: Larry and Andy Wachowski
  Contact: Jim Bloom
  Tippett Studio
  jbloom@tippett.com

- Tippett Studio Muscle System and Skin Solver on "Hellboy"
  Director: Guillermo del Toro
  Contact: Jim Bloom
  Tippett Studio
  jbloom@tippett.com

- Voice of Whale
  Director and Contact: Heebok Lee
  Carnegie Mellon University
  garin2@hotmail.com

- Xelibri: "Beauty for Sale"
  Director: David Fincher
  Contact: Matt Winkel
  Digital Domain
  mwinkel@d2.com

- You
  Director: Francois Vogel-Tool of North America
  Contact: Neysa Horsburgh
  double E communications

Electronic Theater

- Annie & Boo
  Director: Johannes Weiland
  Contact: Thomas Haegele
  animationsinstitut@filmakademie.de

- Astronauts
  Director: Alceu Baptistão
  Contact: Alberto Lopes
  Vetor Zero
  alberto@vetorzero.com.br

- Attack of the Note Sheep
  Director and Contact: Jessica Scott
  Texas A&M University
  jess@viz.tamu.edu

- Bad Boys II
  Director: Michael Bay
  Contact: Jerome Schmitz
  Sony Pictures Imageworks
  jschmitz@sonypictures.com

- BBC2 Big Read Bookworms
  Director: Stefan Marjoram
  Contact: Sarah Hodson
  Aardman Animations
  sarah.hodson@aardman.com

- Birthday Boy
  Director: Sejong Park
  Contact: Ruth Saunders
  Australian Film, Television and Radio School
  ruths@aftrs.edu.au

- Bob and Sam: Episode 1
  Director: Jason Guerrero
  Contact: Jane Hurd
  Hurd Studios
  jhurd@hurdstudios.com

- Boundin'
  Director: Bud Luckey
  Contact: Tom Sarris
  Pixar Animation Studios
  tsarris@pixar.com

- Cortex Academy
  Directors and Contacts: Frédéric Mayer
  ciboulot.noos.fr

- The Edge of History
  Director and Contact: Michael Starobin
  NASA
  michael.starobin@gsfc.nasa.gov

- El Desván
  Director: José Corral
  Contact: José Corral
  ranafilms@hotmail.com

- Frank
  Director and Contact: Taruto Fuyama
  fuyan@taruto.com

- Go To Sleep
  Director: Alex Rutterford
  Contact: Stephen Venning
  The Mill
  stephenv@mill.co.uk

- Gratuitous Goop
  Director and Contact: James F. O'Brien
  University of California, Berkeley
  job@acm.org

- Innocence: Ghost in the Shell (Festival)
  Director: Mamoru Oshii
  Contact: Maki Terashima-Furuta
  Production I.G., LLC
  maki@productionig.com

- The Lord of the Rings:
  "The Return of the King"
  Director: Peter Jackson
  Contact: Eileen Moran
  Weta Digital
  publicity@wetafx.com.nz

- Making of The Superpunch
  Directors: Larry and Andy Wachowski
  Contact: George Borshukov
  ESC Entertainment
  gdborshukov@yahoo.com

- Nike "Gamebreakers"
  Director: David Fincher
  Contact: Matt Winkel
  Digital Domain
  mwinkel@d2.com

- Onimusha 3
  Director: Takashi Yamazaki
  Contact: Ikuo Nishii
  ROBOT Communications Inc.
  nishii@robot.co.jp

- Output-Sensitive Collision Processing for Reduced-Coordinate Deformable Models
  Director and Contact: Doug L. James
  Carnegie Mellon University
  djames@cs.cmu.edu

- Parenthèse
  Directors: F. Blondeau, T. Deloof, J. Droulers, C. Stampe
  Contact: César Volaire
  david@oneplusone.fr

- The Parthenon
  Director and Contact: Paul Debevec
  USC Institute for Creative Technology
  debevec@ict.usc.edu

- PGi-13
  Director and Contact: Beom Sik Shim
  shim@shimbe.com

- The Polar Express
  Director: Robert Zemeckis
  Contact: Jerome Schmitz
  Sony Pictures Imageworks
  jschmitz@sonypictures.com

- Rock the World
  Director and Contact: Sukwon Shin
  School of Visual Art
  123van@hanmail.net

- Rockfish
  Director: Tim Miller
  Contact: Jamie Breuer
  Artisans PR
  jbreuer@artisanspr.com

- Ryan
  Director: Chris Landreth
  Contact: Hélène Tanguay
  National Film Board of Canada
  h.tanguay@nfb.ca

- Shrek 2
  Directors: Andrew Adamson, Kelly Asbury, Conrad Vernon
  Contact: Amy Krider
  PDI/DreamWorks
  amyk@pdi.com

- SIGGRAPH 2004
  ILM Research & Development
  Directors: Steve Sullivan & Brent Bowers
  Contact: Kate Shaw
  Industrial Light & Magic/Lucas Digital Ltd.
  kateshaw@ilm.com

- Spider-Man 2
  Director: Sam Raimi
  Contact: Jerome Schmitz
  Sony Pictures Imageworks
  jschmitz@sonypictures.com

Emerging Technologies

Interactive displays of assumption-shattering concepts that will enhance human life in the near and distant future. Installations of both technology and art created by scientists, engineers, and fine artists. What's next in augmented and virtual reality, ubiquitous computing, displays, hand-held devices, real-time graphics, mobile technologies, robotics, imaging technology, haptics, sensors, gaming, the web, wearable systems, visualization, collaborative environments, entertainment, and art.

Emerging Technologies Committee

Heather Elliott-Famularo
SIGGRAPH 2004 Emerging Technologies Chair
Bowling Green State University

Amber Reed
Administrative Assistant
Bowling Green State University

Paul Dietz
Papers Coordinator
Mitsubishi Electric Research Laboratories

Christopher Evans
Tour Coordinator
Human Muscular Project

Gaye Graves
Presentation Coordinator
NASA Ames Research Center

Preston Smith
Installation Manager
EDS

Emerging Technologies Video Documentation Team

Donald Rasmussen
Project Coordinator
Bowling Green State University

Sebastien Dion
Audra Magermans
Zach Stewart
Bowling Green State University

Emerging Technologies Jury

Bernard D. Adelstein
NASA Ames Research Center

Donna Cox
SIGGRAPH 2005 Emerging Technologies Chair
NCSA/University of Illinois at Urbana-Champaign

Paul H. Dietz
Mitsubishi Electric Research Laboratories

Heather Elliott-Famularo
SIGGRAPH 2004 Emerging Technologies Chair
Bowling Green State University

Andrew Glassner
Coyote Wind Studios

Mk Haley
Walt Disney Imagineering

Jacquelyn Ford Morie
USC Institute for Creative Technologies

Vibeke Sorensen
University of Southern California

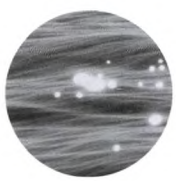
●○○
Emerging Technologies
Rooms 150-152

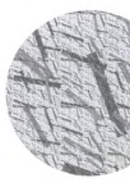
Days & Hours

Sunday, 8 August	1 - 6 pm
Monday, 9 August	9 am - 6 pm
Tuesday, 10 August	9 am - 6 pm
Wednesday, 11 August	9 am - 6 pm
Thursday, 12 August	9 am - 5 pm

●○○
Emerging Technologies Presentations
Room 404AB

●○○
Emerging Technologies Tours
Theme-based, guided tours in many languages. For complete information about times and themes, please visit the Emerging Technologies Tour Booth located at the venue entrance, Room 150.





Presentations, Room 404AB

Sunday, 8 August, 1:45 - 3:30 pm

Realities: Virtual, Haptic, and Augmented

Meet the real-world interfaces that control virtual, haptic, and augmented realities. Ready for a swim? Watch out for the Invisible Train!

Moderator
Bernard Adelstein
NASA Ames Research Center

Sidney Fels
Swimming Across the Pacific

Hiroo Iwata
CirculaFloor

Thomas Pintaric
The Invisible Train

Maki Sugimoto
Time Follower's Vision

Monday, 9 August, 8:30 - 10:15 am

Art and Technology: See It, Feel It, Wear It, Then Have a Seat

Settle back in a rocking chair and experience art and technology that tickles the senses. Should misfit toys be allowed in public spaces? Are sound displays fashionable? What do you think?

Moderator
Jacquelyn Ford Morie
USC Institute for Creative Technologies

Erwin Driessens
Maria Verstappen
Tickle Salon

Noriyuki Fujimura
Remote Furniture

Younghui Kim
HearWear: The Fashion of Environmental Noise Display

Matthew Mohr
3D Spatial Narrative: "The Island of Misfit Toys"

Monday, 9 August, 10:30 am - 12:15 pm

Displays: In the Mind's Eye

Light reflecting off nanotechnology chips can play tricks on your mind's eye. Is it real or just a snared illumination? It's edgy stuff, but thousands of lenslets still want to know!

Moderator
Paul Deitz
Mitsubishi Electric Research Laboratories

Wojciech Matusik
Hanspeter Pfister
3D TV

Ian McDowall
Snared Illumination

Ramesh Raskar
Non-Photorealistic Camera: Automatic Stylization With Multi-Flash Imaging

Tomoyuki Yamamoto
LIFLET: Light Field Live with Thousands of Lenslets

Tuesday, 10 August, 8:30 - 10:15 am

Displays: Dynamic, Collaborative, Natural Vision Color

Displays are the ever-present, essential link between media and the message. And they just keep getting better with natural vision color, true-3D live video, and multi-directional capabilities for a mean game of four-handed video poker.

Moderator
Mark Bolas
Stanford University

Yasuaki Kakehi
Lumisight Table: Interactive View-Dependent Display Table Surrounded by Mutiple Users

Junko Kishimoto
IRODORI: A Color-Rich Palette Based on Natural Vision Technology

Helge Seetzen
High-Dynamic-Range Display

Tuesday, 10 August, 10:30 am - 12:15 pm

Soft Touches: Sensors and Haptic Displays

What you touch is what you see! This is a very "touching" session, where prosthetic sensors create tactile sensations for robotic hands, a soft touch molds 3D images, and a pin-rod matrix provides inspiration.

Moderator
Andrew Glassner
Coyote Wind Studios

Kazuto Kamiyama
GelForce

Masashi Nakatani
Pop Up!: A Novel Technology for Shape Display of 3D Objects

Ivan Poupyrev
Lumen: Interactive Visual and Shape Display for Calm Computing

Yuriko Suzuki
Untethered Force Feedback Interface That Uses Air Jets

Wednesday, 11 August, 8:30 - 10:15 am

Interactive Displays: Touched and Hand-Held

Ready for some fun? In this session, colorful faucets sing do-re-me as we scoop up playful sound flakes from a pool of water. Infrared shadow sensing lets us build a Calder-like mobile. And hand-held projectors allow mouse-like interaction. Care for a projected game of "Hare and Hounds?"

Moderator
Mk Haley
Walt Disney Imagineering

Paul Beardsley
Interacting With Projections Using iLamp Projectors

Satoko Moroi
Sound Flakes

Zack Booth Simpson
Novel Infrared Touch-Screen Technology and Associated Artwork

Wednesday, 11 August, 10:30 am - 12:15 pm

Immersive Art: On Our Walls and Floors

These interactive displays alter the ways we perceive our bodies, as our digital selves become the art. Come join in the homage to particle dreams. It could result in a healing experience or some flocking behavior!

Moderator
Vibeke Sorensen
University of Southern California

Munro Ferguson
June

Brian Knep
Healing

Daniel Shiffman
Reactive

Daniel Shiffman
Swarm

Wednesday, 11 August, 1:45 - 3:30 pm

Art and Technology: Persistent Visions

What do a video time-slicing clock, an artistic autonomous agent that serves up video commentary, and a Zen-based experience have in common? Be persistent, come find out!

Moderator
Donna Cox
NCSA/University of Illinois at Urbana-Champaign

Jussi Ängeslevä
Last

Norimichi Idehara
Dis-Tansu

David A. Shamma
Imagination Environment

Naoko Tosa
Inter-Cultural Computing: ZENetic Computer

3D Spatial Narrative: "The Island of Misfit Toys"

3D Spatial Narrative combines "bullet-time" technology and a unique interactive display mechanism to tell an original story in six "frozen moments."

Life Enhancement
3D Spatial Narrative is a unique way to experience forms and explore virtual spaces. Because interaction is intuitive, users can easily experience the form or narrative displayed. It also shares the goals of interactive cinema (entertainment, exploration, and enlightenment), and it incorporates uniquely intimate and physical modes of interaction.

Vision
3D Spatial Narrative is a delivery mechanism for any possible content that involves form or space. For example, it could be used to create educational experiences in museums or narrative experiences for retail environments.

Goals
To create a seamless interactive narrative.

To push "bullet time" beyond its current application.

To create a delivery mechanism for illusionary display of three-dimensional forms and spatial environments.

Innovations
The technology behind the idea is very simple. It uses a potentiometer (just like the volume knob on a stereo) mounted on the axis of a vertical steel pole. The potentiometer works by resisting current sent from an external source. The amount of resistance is determined by the degree of rotation on the shaft. This resistance is converted into an eight-bit number that corresponds not only to the degree of rotation on the shaft, but also to a specific frame of animation within the bullet-time moment.

A few existing projects, such as Dan O'Sullivan's Panoramic Narrative, use the same core technologies, but Spatial Narrative is the first to use bullet-time technology to allow a user to move around a form or space. It is also the first to create a system of visual relationships between "frozen moments" to form a narrative.

Presentation
Monday, 9 August
8:30 - 10:15 am
Room 404AB

Contact
Matthew Mohr
Parsons School of Design
m@matthewmohr.com

3DTV

Chair's Prerogative Exhibit
A system for real-time acquisition, transmission, and 3D display of high-definition 1300 x 1030 dynamic content. Image acquisition consists of an array of hardware-synchronized cameras that capture multiple-perspective views of the scene. To deal with the high processing and bandwidth requirements, the system uses a fully distributed architecture with clusters of PCs for sending and receiving. A multi-projector 3D display with horizontal parallax only achieves large-scale, high-resolution output images. The system is scalable in the number of acquired, transmitted, and displayed real-time video streams. The hardware is relatively inexpensive and consists mostly of commodity components that will further decrease in price. The system architecture is flexible to enable a broad range of research in 3D TV.

Life Enhancement
This system demonstrates that 3D TV offers a richer, more immersive experience than regular TV. It increases entertainment value and realism without the encumbrance of special glasses.

Vision
Three-dimensional TV is expected to be the next revolution in the history of television. It has only recently become feasible to deal with the high processing and bandwidth requirements for real-time acquisition, transmission, and display of high-resolution 3D TV content. Our system uses existing broadband protocols and compression standards for immediate, real-world 3D TV experiments and market studies. The decoders and receivers are well established and widely available. This system can plug into today's digital TV broadcast infrastructure and co-exist in perfect harmony with 2D TV.

Today, digital broadcast networks carry hundreds of channels and presumably a thousand or more channels after the introduction of MPEG-4. This makes it plausible that a number of them (perhaps 16) will be dedicated to 3D TV. Similar to HDTV, the introduction of 3D TV can proceed gradually, with one 3D channel at first and more to follow, depending on market demand.

Our system uses 16 projectors to produce a view-dependent display with 12.5 million pixels. We believe that new, high-resolution display technologies - such as organic LEDs (OLED), field emission devices (FEDs), and color nanotube displays - will achieve similar or higher pixel resolution in the near future. In conjunction with lenticular screens this will lead to inexpensive, high-resolution 3D displays for consumer devices.

Avenues for future work include: high-dynamic-range cameras and displays, precise color reproduction of natural scenes, 3D video conferencing, and deformable 3D displays.

Goals
The main goal of this work is to show that 3D TV systems can be built today from off-the-shelf components.

Innovations
1. Distributed architecture. In contrast to previous work in multi-view video coding, this system uses distributed processing for acquisition, compression, transmission, and image display.
2. Multi-view video rendering. A new algorithm efficiently renders novel views from multiple dynamic video streams.
3. Scalable system. The system is completely scalable in the number of acquired, transmitted, and displayed views.
4. High-resolution 3D display. This is the first display that provides horizontal parallax with 16 independent perspective views per pixel.
5. Computational Display. The system can render new views to improve the 3D display based on feedback from cameras on both sides of the display.

Presentation
Monday, 9 August
10:30 am - 12:15 pm
Room 404AB

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CirculaFloor

CirculaFloor is a locomotion interface using a group of movable floors. The movable floors employ a holonomic mechanism that achieves omni-directional motion. Circulation of the floors enables users to walk in arbitrary directions in a virtual environment while their positions are maintained.

Life Enhancement
It has often been suggested that the best locomotion mode for virtual worlds would be walking. It is well known that sense of distance or orientation while walking is much better than that while riding in a vehicle. However, the proprioceptive feedback of walking is not provided in most virtual environments. CirculaFloor is a new locomotion device that provides such a sense of walking. It enables a revolution in entertainment or training simulators.

Vision
Although advanced visual simulation often requires a good sense of locomotion, existing systems do not provide credible simulations of walking. One serious application is in an "evacuation simulator." Analysis of evacuation of victims after disasters is important to public safety. But it is impossible to carry out experiments with human subjects during an actual disaster. Since evacuation from disaster areas is accomplished by walking or running, the CirculaFloor will be an indispensable interface device for experimental simulations. Combining the CirculaFloor and an immersive projection display may provide the ultimate sense of presence. This integrated system could greatly contribute to teleoperation or virtual travel.

Goals
Locomotion interfaces often require bulky hardware because they have to support the user's entire body. Also, the hardware can not be easily reconfigured to improve performance or add new functions. Considering these issues, the goals of the CirculaFloor project are:

1. To develop compact hardware for creation of an infinite surface for walking. The major disadvantage of existing locomotion interfaces is difficult installation.

2. To develop a scalable hardware architecture for future improvement of the system. We have designed a new hardware architecture that supports easy upgrading of the actuation mechanism or adding new mechanisms for creation of uneven surfaces.

Innovations
The major innovation of this work is a new method for creating an infinite floor. Treadmills can provide infinite floors, but they can not easily enable omni-directional walking. A system that offers a motion foot pad for each foot can simulate omni-directional walking as well as walking on uneven surface. The major limitation of this method is the walker has to be careful not to mistrace the foot pad.

The CirculaFloor is a new method that combines the advantages of treadmills and foot pads. It creates an omni-directional infinite surface with a group of movable floors. Combining the floors provides sufficient area for walking, so precise tracing of the foot position is not required. And it is possible to create uneven surfaces by mounting up-and-down mechanisms on each floor.

Presentation
Sunday, 8 August
1:45 - 3:30 pm
Room 404AB

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Dis-Tansu

Chair's Prerogative Exhibit
A three-dimensional image presentation box that requires no equipment attached to the viewer. The key technique is motion parallax. When the drawer slides in and out, models are rendered according to the assumed viewpoint and the position of the drawer, which provides recognition of depth. You can also interact with the objects in the box by movement.

Life Enhancement
Dis-Tansu is a miniature garden. You can affect the garden by moving the drawers, which creates wind and waves. The waves make you feel the movement of drawers. As time goes by, the scenery changes. Dis-Tansu reveals the beauty of nature and implies that to everything there is a season, or that "the running river is eternal, but the water is never the same." (Kamo no Chomei, "Hojo-Ki," 1212).

Vision
With Dis-Tansu, you can demonstrate 3D models very easily. One possible application is a presentation system for science museums, so that anyone can interact with objects without instructions. In this application the physics or the time scale inside the box would be different from the current version.

Goals
The main goal is to display more realistic, more natural images. Future versions will be improved in three ways:

1. Passive detection of the user's viewpoint.
2. Utilizing more accurate, more complex rendering shaders.
3. Use of LCD monitors that can generate stereoscopic information without glasses.

Innovation
The combination of motion parallax and interaction with velocity and acceleration inspired development of Dis-Tansu. To start an interaction, you naturally need to slide the drawer, and the feedback is not only the force but also the sense of depth. Furthermore, everyone knows how a drawer works, so there is no need for instructions.

Presentation
Wednesday, 11 August
1:45 - 3:30 pm
Room 404AB

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GelForce

GelForce is a novel interface that measures the distribution of both the magnitude and direction of force. The sensor is composed of a transparent elastic body, two layers of blue and red markers, and a CCD camera. Force vectors are calculated from the captured movement of the markers.

Life Enhancement
The GelForce sensor measures information that cannot be obtained by existing sensors, so it is a promising tool for a myriad of applications. It can be used as an intuitive computer interface like the touchpad or mouse, but with a much richer geometrical structure. This characteristic makes it a powerful way to interact with virtual environments modeled with physical parameters. For example, it could be used as a molding instrument for realistic sculpting and image processing. It also provides lush external input for real-time physical simulations.

The sensor is also an adept way to endow robotic and prosthetic devices with tactile sensations similar to human capabilities. When we pick up a fragile object such as a glass, we perceive its weight as a force parallel to our skin, and we respond by controlling the grasping force to prevent slippage. When the moldable GelForce sensor is combined with a robotic hand, the robot can receive force information parallel to the fingertip and respond with the same degree of dexterity.

Vision
It would not be an exaggeration to say that every scientific technology is based on sensors. For example, audio recording cannot exist without measurement of sound, and television broadcasts would be impossible without converting radio waves to image data. The GelForce sensor could become equally essential. It can measure all information about force: direction, magnitude, and distribution. And its sensing mechanism is quite simple, so the sensor can adopt various shapes. Popular devices that incorporate tactile sensation are certain to become mainstream in the near future.

Goals
One of the goals of this project is to develop a finger-shaped sensor and attach it to a robotic hand so that robots with tactile sensation can perform fine manipulation tasks just as humans do. Existing sensors on mechanical hands cannot measure sufficient force information to perform most everyday tasks, which severely limits the development of field robotics.

The simple structure of this elastic sensor enables an elegant solution to these two issues. The sensor does not require a complex sensing unit. It uses markers within a gelatin body, which can be arranged at high density. In addition, because the sensor only needs to capture the markers, it can be crafted into any shape that allows it to do so.

Innovations
The core innovation is the technique to derive distribution-of-force vectors from the movement of two layers of colored markers. If the sensor includes only one layer of markers, only the magnitude of force can be measured with any degree of accuracy. Two cameras (for stereoscopic vision) would be required to measure the three-dimensional movement of markers. But using two cameras would require complex camera calibration and a much larger system. These complications would make downsizing the sensor infeasible. The GelForce sensor solves this problem with two layers of markers at different depths, which delivers sufficient measurement information to readily obtain a force-vector distribution.

Presentation
Tuesday, 10 August
10:30 am - 12:15 pm
Room 404AB

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Healing

Healing is a series of interactive floor pieces, each with a unique, dynamic pattern. These patterns pull away from visitors, creating wounds, which heal after the visitors leave. Each piece, however, heals itself in a different way.

Life Enhancement
Healing is an art piece that hopefully embodies questions and concerns relevant to our lives.

Goals
Healing explores responses to interaction. Contact between two entities changes both of them and so has a destructive quality. Change, however, forces growth, as the entities attempt to integrate the effects of the interaction, so contact can also have a regenerative quality. It is this growth in response to change that is the focus of these pieces.

Innovations
The system includes a video camera, a computer, a video projector, and a rubber mat. The camera looks down at the mat from the ceiling and captures video of both the mat and gallery visitors. The video is sent to the computer, hidden behind or mounted on a wall, where custom vision algorithms locate visitors and other foreign bodies. These locations are sent to the pattern-growth algorithm, which adjusts the pattern accordingly. The pattern is then sent to the projector and displayed on the mat.

The pattern-growth algorithms are based on reaction-diffusion equations, which describe the behavior of several chemicals diffusing over a surface and reacting with one another. Many natural patterns are thought to form through reaction-diffusion-like processes, including animal markings. The simulation algorithms must be fast enough so that the growth feels organic, but stable enough so that the simulation is always well behaved.

Presentation
Wednesday, 11 August
10:30 am - 12:15 pm
Room 404AB

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HearWear: The Fashion of Environmental Noise Display

HearWear is an electronic wearable that reacts to urban noise with moving light patterns. It delivers a playful display of urban sounds and noise pollution to the wearer and all passersby.

Life Enhancement
Compared to public awareness of air and water pollution, awareness of noise pollution is relatively small. It is not that we do not suffer from loud passing noises (car horns, fire trucks, construction, etc.). We just do not seem to notice them in the everyday cityscape.

HearWear simply expresses the sound levels of the environment we pass through and lets us interact with the surrounding noises by transforming them to a visual wearable art display.

Vision
As a fashion accessory, HearWear connects people by sensing and displaying noise-pollution data. It enhances environmental awareness and advances unnoticeable integration of technology in day-to-day living.

It is true that fashion is a statement. With technology, fashion can be more expressive and informative. HearWear anticipates a future in which we use more discreet technology in everyday fashion.

Goals
To demonstrate how technology can move beyond gadgets to seamless integration with familiar everyday fashion accessories.

To remind us of noise pollution and stir a discussion about possible remedies for this environmental issue.

To experiment with a practical art form that moves around the city and reacts to the constant change of city sounds.

Innovations
HearWear integrates a custom-engineered printed circuit board and software with existing hardware components.

The system interprets sound with light in an innovative way. A sound recognition module is driven by a micro-controller to perceive and qualify characteristics of noise patterns. The micro-controller is programmed to activate a number of LEDs and electro-luminescent wires.

The technology is modular and can be applied to any wearable item: jackets, bags, skirts, T-shirts, pants, belts, and other apparel and accessories.

Presentation
Monday, 9 August
8:30 - 10:15 am
Room 404AB

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High-Dynamic-Range Display

This high-dynamic-range (HDR) display uses active light-emitting diodes behind a high-resolution color liquid-crystal display and offers 4,000 Nits (or cd/m2) to 0.05 Nits (or cd/m2) luminance range at video rate with an extended color gamut and 16-bit depth per color.

Life Enhancement
This HDR display achieves unrivaled brightness, contrast, and color accuracy, which are required in many applications: film editing, medical imaging, satellite imagery, etc.

Vision
This system offers a competitive solution with 300 times higher contrast, 10-30 times higher brightness, 10-30 times lower "darkness," and 38 percent better coverage of the NTSC color gamut due to the use of RGB LED. It is a very strong challenge to conventional display technology. We believe that the HDR display can become the TV display solution of the future.

Goals
Development of a commercially competitive display system that can show images that are visually indistinguishable from the outside world (at the right viewing distance).

Innovations
Combination of a locally dynamic backlight and LCD.

Low-resolution backlight with compensation in high-resolution LCD.

Psycho-physics theory to support compensation.

Real-time driver software.

Various applications for HDR displays (volume renderers, image browsers, editing tools, etc.).

Presentation
Tuesday, 10 August
8:30 - 10:15 am
Room 404AB

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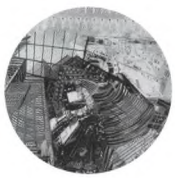

Imagination Environment

Using any video stream as its starting point, the Imagination Environment discovers images linked to words and shows us the flow of connections between ideas and images that we ourselves crafted. Exploiting the connectivity of the web and the core technologies of information retrieval, it is a machine's "imagination" of who and what we are.

Life Enhancement
Search engines, blogs, web portals, and individual web sites are reflections of our cultural reality. They represent a set of created systems that expose and heighten the connections we use, but rarely see, both in our minds and in the online world. By exposing both their results and processes, these systems reflect and reuse the mundane, the available, and the purely popular as art. In doing so, the system itself is an artistic agent, gathering, sifting, and presenting our own reality back to us as it moves through the web, seeking information.

Vision
Imagination Environment uses video and images to construct a new sort of media object that immediately exposes the cultural connections that exist between the video and the other information that surrounds us. We are creating several new installations, each with its own unique view of the world of information, from digital improvisers to large-scale distributed narrative videos.

Goals
This project creates a new area that we call "network arts." At the core of network arts are technological advancements in information retrieval, social networks, and semantics, and a new cultural understanding of meaning, impact, and artistic portrayal. It is important for the portrayal to be meaningful to the culture it represents and not esoterically complex. Our goal is that in this new form of art and technology, we introduce the machine in art to support a new breed of artists who are able to harness the power of these interconnections to not only create art with the machine, but also create artistic agents that themselves are active in the creative process.

Innovations
Imagination Environment uses advanced information n-retrieval techniques on media streams that are invisible to us. When we "watch" TV, the TV receiver is reading (actually decoding) the closed-captioning stream and using it to identify what is being said. Then, by exploiting indexing mechanisms within search engines, it finds distinct images and displays them as juxtaposition, to externalize either the canonical or the popular culture.

The driving system is an autonomous agent. Each performance is different in both pace and content. The speed of a slow dramatic movie monologue does not match that of a live speech or a fast hip-hop video. Imagination Environment balances its rate of image presentation based on the pace of the content and the available presentation space (number of available monitors).

The actual accounting method varies depending on the structure of the source. For DVD closed-captioning information, Imagination Environment looks at how many words are in a caption and how many captions are on the screen at once, since each line counts as a caption. It then determines salient words by removing stop words, recognizing characters' names, and so on. Once it determines the set of terms to display, it looks at the number of available monitors and loads new images over the screens that no longer apply to the current video's context. The rate at which this happens is synchronized with the speed at which the captions are sent in the video stream. To keep the flow state engaging, thresholds are set to keep the images from changing too fast or too slow, which prevents the audience from being overwhelmed or becoming bored. This is a new application of software agents and artificial intelligence technologies.

Presentation
Wednesday, 11 August
1:45 - 3:30 pm
Room 404AB

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Interacting With Projections Using iLamp Projectors

Projectors are becoming very compact, and this is driving an evolution in their functionality. This project demonstrates a handheld projector that enables straightforward, one-handed interaction with projected content. It envisages current handheld devices such as cellphones and PDAs augmented with projectors that supplement or even replace built-in screens with larger projected displays. Interacting with a projection offers a new medium for WIMP functionality. The project goes further still in showing how handheld projection supports a quite new type of interaction for multiple users, who can share a pooled display in which individual projections are intelligently combined.

Life Enhancement
Cutting-edge devices like tiny projector-keyboards are already showing the possibilities as projectors shrink in size. This work demonstrates how a projector can be a handheld device, and how our everyday surroundings can be transformed into both a display surface and a medium for interaction with the projected data.

Goals
The goal of the project is to change perceptions about projectors. The prototype device makes it possible to visualize personal, handheld projectors for use in the near future. Add a method for interaction with the projected data, and this becomes an innovative addition to the existing array of handhelds. Projection does have limitations because of interference with ambient light and the unsuitability of some display surfaces. Furthermore, this prototype enables only mouse-style interaction, not text-entry. But interactive projection still opens up a range of possibilities in a little-explored area of the human-computer interface.

Innovations
Stabilized Projection
An immediate requirement for a handheld projector is to stabilize the projection on the display surface, therefore removing the effect of hand-motion. This handheld device includes a camera that determines the position of the projector relative to the surface, enabling continual modification of the projected data, so that it appears static on the surface even though the projector itself is moving. The position recovery is supported by an inertial sensor and laser pens on the device.

Interactive Projection
The core innovation is a technique for tracking an independently moving cursor across a stabilized projection with single-handed motion. A touchpad or thumb wheels on the projector could move the cursor across the projection, but this would increase device size, and it would be a clumsy interaction that might require two hands. This project shows how to track a cursor across the stabilized projection by a natural one-handed pointing motion of the projector.

Hardware
The handheld projector includes a projector, a camera, an inertial sensor (gyro/accelerometer board), and four laser pens. The device also has click buttons for user interactions. All components are commodity items, but a projector augmented with this range of components is currently an unusual and novel device.

Presentation
Wednesday, 11 August
8:30 - 10:15 am
Room 404AB

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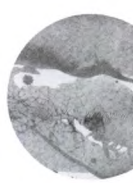

Inter-Cultural Computing: ZENetic Computer

ZENetic is an interface that evokes self-awakening through essential aspects of Zen Buddhist culture. Through esoteric riddles, ZENetic teases particular cognitive responses from users, as reflections of their inner, subliminal consciousness. With stories portrayed in ink painting, haiku, and kimono, ZENetic conveys the rich allegorical interaction characteristic of Eastern philosophy.

Life Enhancement
People of many different nationalities, cultures, and customs live in the world. With a new method of inter-cultural computing that uses advanced interaction technologies, we can offer a totally new and personal experience through which people can feel and understand different cultures. Based on this approach, everybody can gain cross-cultural understanding that leads to a real understanding of "symbiosis." This real understanding of different cultures is very important for peace throughout the world.

Vision
From this beginning, we will extend our cross-cultural translation system on the network to encourage interchanges in cultural anthropology, art, literature, philosophy, psychology, and sociology.

Goals
To develop new theories, models, and methods, that may shed new light on how a given culture may be translated into a format that would enable users from different cultural origins to access the deeper significance of the translated culture.

Innovations
ZENetic applies some aspects of Buddhist philosophy as a model in computational science. Our motivation derives from the more than 2,000 years of innovative Buddhist tradition. Methods of interaction between Zen master and pupil, developed to sharpen the understanding of human consciousness, provide a rich base for interactive modeling - a field still unexplored in the Western scientific tradition.

Presentation
Wednesday, 11 August
1:45 - 3:30 pm
Room 404AB

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The Invisible Train: A Handheld Collaborative Augmented-Reality Demonstrator

The Invisible Train is a multi-player game that illustrates the capabilities of a framework for rapidly developing self-contained, distributed graphics applications on a variety of commercially available handheld computers.

Life Enhancement
As handheld devices become more widespread, the need for software tools to develop a new range of mobile applications is likely to increase. This software framework forms a sound basis for development of a variety of mobile software applications, ranging from handheld location-based information systems to miniaturized versions of "classic" mobile augmented-reality applications.

Vision
Hardware-accelerated mobile graphics solutions are generating a need for a software infrastructure that permits development of applications that go beyond simple games and multimedia gimmicks. The Invisible Train development team focuses mainly on systems/framework design, so we will be able to utilize upcoming hardware-accelerated mobile graphics systems (from which we expect tremendous quality and performance improvements) in order to engineer more involving mobile applications.

Goals
The goal of this project is to strike an optimal balance between mobility and performance criteria, so it focuses on personal digital assistants as hardware platforms. This PDA-based approach is unique because it builds upon the PDA as a central system component that is unconstrained in terms of infrastructure requirements instead of just using it as a thin client or a mere server-controlled input/output device.

Innovations
The Invisible Train installation illustrates how augmented-reality applications can be built with a high-level mobile AR framework. The framework's core components are:

Graphics subsystem
This mobile AR framework uses KLIMT, a software renderer that implements a subset of the OpenGL and OpenGLIES API. Klimt is being developed with portability and performance in mind and is available under the GPL for Linux, Windows, and WindowsCE. We also ported the well known Coin library (an OpenInventor reimplementation by Systems In Motion) to the handheld platform to allow for rapid data-driven application development with scene-graphs.

Tracking subsystem
The framework includes an integrated fiducial-based visual-pose tracking system. We further enhanced tracking accuracy with a multi-marker relaxation algorithm. The use of vision-based tracking is a natural choice because of the increasing availability of cameras for and in mobile devices.

Communications subsystem
To handle synchronization tasks mandated by distributed systems, the communications layer is based on ACE (the Adaptive Communications Environment being developed at Washington University).

Presentation
Sunday, 8 August
1:45 - 3:30 pm
Room 404AB

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IRODORI: A Color-Rich Palette Based on Natural Vision Technology

IRODORI uses a novel display technology to render new colors that cannot be reproduced by existing displays, such as high-chroma colors, luminescent and fluorescent colors, and very deep, dark hues.

Life Enhancement
It is now possible to design computer graphics using colors that are seldom encountered. This capability broadens the range of expressions available in the digital world. Digital images will have greater power than ever before.

Vision
IRODORI provides new tools for creators. Initial applications will be in media and digital art, but this new technology will gradually expand to theaters and video-game projection (which call for stimulating and high-chroma expression) and TV and personal-computer displays. The best way for people to appreciate IRODORI is to actually experience its expanded choice of colors, because when it comes to communicating a color story, "Seeing is believing."

Goals
The goal of this project is to expand the visual-telecommunication system with high-fidelity, natural-color reproduction capability. It incorporates multispectral and multiprimary imaging technologies in the color-imaging platform to enhance digital expression.

Innovations
The core IRODORI technology is an interactive CG rendering system that uses multiprimary display. A six-primary-color projection system is composed of two modified LCD projectors. Different sets of filters are employed in the two projectors. Images projected from the two projectors are overlaid on the screen. The six-primary-color projector can reproduce a color gamut 1.6 times larger than conventional projection systems. In addition to an LCD projector system, the IRODORI team has also developed several types of multiprimary display systems, such as a six-primary-color DLP projector system, a four-primary-color flat panel LC display, and new hardware that corrects geometrical distortion caused by the different positions of the two projectors.

The system includes new color conversion methods, which are essential for generating multiprimary color signals from colorimetric image data. A six-primary-color projector system is connected to an ordinary PC, so conventional and familiar CG software can be used. The three-to-six signal converter has a three-channel input interface and a six-channel output interface, and uses 3D-LUT interpolation.The three-to-six signal converter and these technologies allow the user to naturally and interactively draw CG images on a multiprimary display system.

Presentation
Tuesday, 10 August
8:30 - 10:15 am
Room 404AB

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June

This stereoscopic installation was made using SANDDE technology developed by IMAX Corporation, which allows artists to draw in space by hand. SANDDE enables a new art form combining the attributes of drawing sculpture, movement, and sound.

Life Enhancement
New kinds of art experiences like June enhance life by expanding the range of visual language available to us. The boundaries of human articulation are pushed a little outward each time this happens.

Vision
I hope that drawing in space will evolve as an important new way for people to express themselves, as other important developments in the history of art have done. Like oil painting and photography, which have enlarged the range of visual experience and visual language, space drawing is a new medium that has the potential to push the boundary of human consciousness a little further, which is all that art really tries to do.

Goals
I made June with the National Film Board in memory of the mixed-media artist and filmmaker Joyce June Wieland, who died of Alzheimer's disease in 1998. She was my friend and teacher. After Joyce died, Jane Lynn, who was writing her biography, asked me what it was like to know Joyce. I found that difficult to express in words. She was such a fountain of imagination and inspiration. And her death was so sad. This wonderful mind and spirit went away and was lost. All that remained was our memories of her and her art. With June, I tried to express visually what I couldn't say with words. It is about my experience of knowing Joyce at the height of her creativity and during her demise. I used some motifs that Joyce loved, like circles and curling lines.

Another goal was to explore some of the possibilities of combining animation with installation art to bring animation into the art-gallery context, thus pioneering a new venue for short auteur animation, outside of cinema and television. Finally, I wished to explore some of the sculptural and environmental art potential of stereoscopic imagery.

Innovations
SANDDE (Stereoscopic Animation Drawing Device) is a combination of specialized software and hardware apparatus for creating hand-drawn animation in 3D space. It was invented by Roman Kroitor and developed by Paul Kroitor and Greg Labute for IMAX Corporation. Unlike other forms of computer-generated stereographic imagery, SANDDE uses lines that are drawn by hand, literally in space, rather than mathematically generated 3D models, which lack the spontaneity and expressiveness of drawings made by hand. A smile is the easiest thing in the world to draw, but the hardest to model convincingly in a conventional 3D computer animation system. SANDDE has a key advantage in this regard. One of its unique features is its space-drawing capability. Its vector-based animation software was originally designed for creating IMAX 3D movies. June represents a creative new use of SANDDE technology, specifically to make a new kind of art.

Presentation
Wednesday, 11 August
10:30 am - 12:15 pm
Room 404AB

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Last

Last is an analogue clock that uses a live video feed to paint the clockface over time. Instead of displaying the current moment, Last shows a time buffer of one minute, one hour, and 12 hours in the trails of its hands. The clock displays the rhythm and history of the space.

Life Enhancement
By revealing the rhythm of our living space, providing a means of reflection on what has happened, or opening a channel between two remote places in the form of cross-streaming the system gives peers, friends, and family members a sense of presence of each other without using direct videoconferencing systems.

Vision
Last could develop into public-space installations or personal-communication channels between company headquarters, members of a family, or work groups. It attempts to enrich the space with its aesthetic as well as the information it transfers and stores.

Goals
Goals include creating a new way of representing time, leveraging our ability to read traditional clocks, and providing an extra layer of information in the form of the video feed. A central goal was also to create something aesthetically pleasing, interesting, and ever-changing without having to succumb to randomness. Finally, the project attempts to serve a real purpose by providing a display that lets us see an overview of the dynamics of a given space. For instance, in a busy train station, the system would clearly inform even newcomers when rush hours occur and the customary times for lunch breaks and opening hours.

Innovations
Combining time slicing as a form of video processing to a commonly shared frame of reference that everyone can easily understand: the analogue clock.

Presentation
Wednesday, 11 August
1:45 - 3:30 pm
Room 404AB

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LIFLET: Light Field Live With Thousands of Lenslets

LIFLET is a true 3D live video system that can synthesize free-viewpoint images interactively from thousands of views of 3D dynamic scenes.

Life Enhancement
2D images and videos have revolutionized our daily life. The keyword of the next step of visual media must be "3D." A true 3D live video system could enhance your visual experience.

Vision
This is the beginning of true 3D live video, which could introduce new digital media such as digital holographic video. It is suitable for various applications, including 3D broadcasting, 3D photometric archiving, and 3D content creation for movies or games. This is not a 3D display technology, but a real-time image-based rendering system that is applicable for living things and complex reflection and refraction in the real world. We are planning to extend and improve the optical system to achieve higher resolution of synthetic images.

Goals
The overall goal of this project is to provide a true 3D live video system. Two subsidiary goals:

1. To capture dynamic light fields of a 3D scene densely enough to synthesize free-viewpoint images. For this purpose, we introduce thousands of lenslets.

2. To synthesize free-viewpoint images of the scene from the captured light field, interactively. The synthesized image should be free of any distortion and maintain correct parallax and occlusions of the scene.

Innovations
The system offers three technical innovations:

1. A simultaneous capturing system with thousands of lenslets. With the advice of NHK Science & Technology Research Laboratories, we developed capturing optics composed of an array of lenslets, an XGA video camera, and a depth-control lens. This system can capture thousands of views of a scene simultaneously, while the camera array system can capture up to tens or hundreds of views.

2. An interactive method of displaying free-viewpoint images of dynamic scenes. From the captured thousands of views, we can synthesize free-viewpoint images interactively. The whole process from capturing to interactive display is performed in real time.

3. A software approach to remove optical distortions. In order to extend the depth of field, we introduce the depth-control lens. Unfortunately, this lens causes an optical distortion. We apply the concept of ray tracing to remove the distortion.

Presentation
Monday, 9 August
10:30 am - 12:15 pm
Room 404AB

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Lumen: Interactive Visual and Shape Display for Calm Computing

Lumen is an interactive display that presents visual images and physical, moving shapes, both controlled independently. The smooth, organic physical motions provide aesthetically pleasing, calm displays for ambient computing environments. Users interact with Lumen directly, forming shapes and images with their hands.

Life Enhancement
There is something magical and emotionally engaging in smooth, slow physical motions, such as waves of the sea or the motion of grass in the wind. The word "organic" perhaps most closely defines them. Lumen delivers such slow, organic animations, creating calm, emotionally pleasing shape and image displays for future living environments.

Lumen's ambient, calm computing environment is ideal for presenting minimal information unobtrusively. Though the current system is small, Lumen can be easily scaled up to create larger surfaces embedded into walls, furniture, and ceilings, and it can become invisible when it is not needed.

Physical shape can be very expressive in communicating between human and machine: using the same image but different physical motions can create a very different "feel of the data." Users interact with Lumen by simply moving their fingers over its surface. They can also interact with each other by touching hands in Lumen's asynchronous image and shape display.

Vision
As new actuators and "artificial muscle" technologies are developed, Lumen could be used to create wall-size, low-power, inexpensive displays for home and office interiors or architecture. It will allow users to present information in a simple, aesthetically pleasing, yet efficient way, creating a new layer of information devices for ubiquitous computing environments. Lumen technology could also be used to create virtual controls: buttons and sliders that are formed dynamically.

Goals
This project has three main goals:
1. Alternative information displays
2. New communication experiences
3. Novel human-machine interaction

Innovations
The entire Lumen device is custom made; it cannot be simply assembled from the off-the-shelf components. Designing Lumen was a challenge because it is intended for home use, so it must be compact and noiseless, actuation should be smooth and continuous, and users must be able to interact with the device directly, without using any external input devices.

Adding interactivity was another innovation. A custom-made Smart Skin sensor was built into the surface of the Lumen to recognize shapes and fingers. It can also feel the user's motions. It calculates the distance between the hand and the surface by using capacitive sensing and a mesh-shaped antenna made of simple copper wire.

Presentation
Tuesday, 10 August
10:30 am - 12:15 pm
Room 404AB

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Lumisight Table: Interactive View-Dependent Display Table Surrounded by Multiple Users

Lumisight Table is a novel interactive table display that can display information in each required direction on a shared screen and capture multiple users' gestures simultaneously.

Life Enhancement
When you use a computer, your eyes are focused on a display, and your hands are restricted to a keyboard or mouse device. This is bad for communication and collaboration. In collaboration, nonverbal communication modalities such as eye contact, facial expressions, and the handling of physical objects, are just as important as the verbal modality. With Lumisight Table, you can stay close enough to maintain nonverbal communication and collaborate while using computers, since its display is physically single but visually multiple. This feature could improve human relationships and enhance the efficiency of cooperative work.

Vision
Lumisight Table could improve the efficiency of some applications in computer-supported cooperative work because it optimizes the direction of projected information to each user around the table. Users can see mixed and integrated displays of public and private information on a single screen.

Lumisight Table could also open up new kinds of video games, including poker and mahjong. For example, you can use physical chess pieces while Lumisight Table acts like a computerized chess board on which you can see both a shared public game board and some unique private hints. Gaming is one of the attractive applications for Lumisight Table.

Goals
The goal of this project is to provide a versatile platform for various interactive applications among multiple users. This goal is supported by three specific objectives:

1. To develop an interactive display system that allows users to stay close enough to maintain verbal and nonverbal communication while they are viewing their own computer output.
2. To achieve appropriate input methods for this kind of display medium.
3. To develop attractive and specialized applications for the Lumisight Table, including games and computer-supported cooperative work.

Innovations
Lumisight Table offers four core technical innovations:

1. Optical design of a special screen system composed of a building material called Lumisty film and a Fresnel lens. The system combines these films and lenses with projectors and cameras to display four different images, one for each user's view.
2. A method for adjusting four different projector images on a single screen. With this method, four projectors can project identical portions of images onto identical positions on the screens.
3. A method for capturing the appearance of the tabletop from inside the system.
4. A method for mixed and integrated display of public and private information on a single screen.

Presentation
Tuesday, 10 August
8:30 - 10:15 am
Room 404AB

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Non-Photorealistic Camera: Automatic Stylization With Multi-Flash Imaging

This is a multi-flash camera that can automatically generate stylized images and videos. Strategically positioned flashes cast shadows along silhouettes in the scene. The detected silhouettes are rendered in cartoon style or as technical illustrations. This overcomes the need for per-frame photo editing or 3D scanning of environments.

Life Enhancement
Consider imaging a white piece of paper with a white background. A traditional camera will record a mostly white image, and the shape of the paper will be lost or difficult to perceive. This non-photorealistic camera is inspired by techniques used by skilled artists and digital illustrators to make images comprehensible: accentuating important features and reducing visual clutter.

Vision
Detecting silhouettes and depth edges in a real scene is a very challenging task. Intensity edges are different from depth edges, so a simple intensity-edge detection in photo editors will not create the same quality of shape boundaries that we generate. We are showing applications in generating stylized images, but the captured depth edges can be used in many other applications.

Goals
We intend to automate tasks for stylized rendering where meticulous manual operation was originally required, such as image editing or rotoscoping. We also aim to demonstrate and create awareness of the use of silhouettes beyond stylized imaging in other applications.

Our goal is to create stylized images that facilitate viewer comprehension of the shape of the objects depicted.

Innovations
This project shows that it is possible to bypass geometry acquisition and directly create stylized renderings from images and video. Instead of expensive, elaborate equipment for geometry acquisition, we propose using a camera with a simple extension: multiple strategically positioned flashes. Rather than estimating the full 3D coordinates of points in the scene and looking for depth discontinuities, our technique reduces the general 3D problem of depth-edge recovery to one of 2D image processing.

Our approach is based on taking successive photos of a scene, each with a different light source close to and around the camera's center of projection. We use the location of the shadows abutting depth discontinuities as a robust cue to create a depth-edge map in both static and dynamic scenes. We produce enhanced images and videos that more clearly convey the 3D structure of the imaged scene. The depth-edge map can also be used to produce other types of non-photorealistic or artistic renderings.

Presentation
Monday, 9 August
10:30 am - 12:15 pm
Room 404AB

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Novel Infrared Touch-Screen Technology and Associated Artwork

This is a novel technique for a touch screen using front-projected infrared with a rear-projected interactive video display. The technology is demonstrated with three art pieces. Two of the art pieces allow participants to create works in the forms of Calder and Mondrian. The third is a visualization of radio interferometry.

Life Enhancement
This technology is generally applicable to numerous user-interface applications. However, I have chosen to use it for interactive artwork. In my opinion, artwork by its very nature enhances the life of both creator and viewer. In this and all artwork I create, I strive to give participants a playful environment in which to interact. I believe that all play is a form of learning, and I hope that my projects create at least intuitive, if not deeper, understanding of some aspect of life or the universe without necessarily being overtly didactic.

Vision
Unlike my previous shadow-sampling techniques, I believe that this system has very broad usefulness beyond interactive artwork (my primary concern). In particular, I can imagine it being used in situations where one wants to permit interaction without any exposed devices such as shopping windows or gallery fronts.

Artistically, I believe that interactive artworks such as these and others that I have created have a broad appeal to an enormously wide range of audiences. I have rarely displayed any interactive work that did not elicit smiles, laughter, and a childlike sense of playfulness in the participants. The power of interactive art lies in harnessing play, as is manifest in games of all kinds, from traditional sports and board games to advanced video games. Play is a powerful, if poorly understood, human instinct and is a powerful tool which, when harnessed properly, delights and teaches in unexpected ways.

Goals
Technologically: Proof of concept that infrared shadow-sensing works.

Artistically: To permit participants to work in the form of two famous abstractionists (Calder and Mondrian) so they can explore their work as a creator instead of as a viewer. In the case of "Interference," to build intuition for the beautiful mathematics of wave mechanics.

Innovations
All hardware components are off-the-shelf consumer items. The key innovation is the idea that multiple, diffuse light sources cast from oblique angles can be used as an image-detection system. Many well-known image-detection and filtering algorithms are exploited, and coded in custom C/C++. Also necessary are the calibration algorithms that correlate camera space to screen space, but these algorithms are not novel, as I used identical code in the shadow detection pieces displayed at SIGGRAPH 2002.

The artistic components include several innovative uses of commonly available algorithms. In particular, the Calder piece relies heavily on an open-source physics engine (ODE).

Presentation
Wednesday, 11 August
8:30 - 10:15 am
Room 404AB

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Pop Up!: A Novel Technology for Shape Display of 3D Objects

Pop Up! is a new visual and tactile display for presenting 3D shapes using a pin-rod matrix that conveys visual depth information and is designed to be touchable. Due to its broad range of movement, it is capable of displaying large-scale, dense objects such as human faces, geographical features and landscapes.

Life Enhancement
When they create digital artwork with this Pop Up! display, artists can see not only a 2D perspective, but also a complete, touchable 3D shape. The form can be directly modified with hand motions, just like sculpting with clay. CG artists share a common dream: to directly manipulate 3D CG works with their own hands, but only classical and bulky force-feedback devices have even partially achieved this objective.

Pop Up! can also be used to create powerful advertising. Almost all visual advertising displays 2D images, on paper, in video, or on billboards. With Pop Up! advertisers could display large objects and change their shapes in real time.

Vision
In the near future, 3D information will be shown not only in 2D flat displays, but also in true 3D systems. Pop Up! is an infant example of this next-generation display technology. The system solves three practical problems: speed, density, and pixel volume. In a few years, it might be hard to imagine life without Pop-Up!

Goals
One goal is realization of a "face phone" that can display dynamic range-finder data obtained from a human face. Conventional videoconference technology can convey vocal and visual information, but a "face phone" could also convey a sense of existence, which would enhance human communication.

The ultimate goal is for Pop Up! to become a substitute or supplement to the traditional LCD or CRT display, to enhance its quality and modality as a 3D interface.

Innovations
The most important innovation of this display is its use of a coil-formed shape memory alloy (SMA) as an actuator. Ordinary SMA does not have a long stroke, and the movement is quite slow, which is the main reason why it is generally avoided as an actuator. To improve its response rate, the SMA was formed into a coil, which enables much faster cooling than previous SMAs. Thanks to its thinness, speed, and simplicity, it is an ideal actuator for Pop Up!

Activating multiple actuators at the same time is another technical challenge. Because the goal of this project is to drive 32 X 32 pin rods, it uses a "matrix drive" method. In most matrix-drive systems, such as those used in LCDs, each element reaches its target luminance instantly. But the SMA reaches its target position with some delay, which is a function of its previous position. Therefore, the challenge is to optimize time-scheduling, to determine how much time should be assigned to each pin rod. Pop Up! features a custom-optimized controlling algorithm that enables real-time display.

Presentation
Tuesday, 10 August
10:30 am - 12:15 pm
Room 404AB

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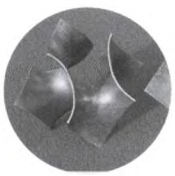

Reactive

Reactive is a live video installation that amplifies a user's movements with exploding particle systems in a virtual space.

Life Enhancement
Reactive changes the way we visualize digital images and interact with computer-generated art. In feeding off the unpredictable shapes of human behavior, Reactive asks us to look at our (increasingly digital) selves in a fresh way.

Vision
Inspired by Karl Sims' "Particle Dreams," Reactive is an art piece that questions how we define, deconstruct, and display digital images. It is my hope that artists and technologists alike will take these questions with them as they develop and create future work.

Goals
The goal of this project was to create an engaging, interactive artwork. Specifically, I wanted the artwork's interaction to be simple, playful, and beautiful.

Innovations
Traditionally, a digital image is viewed as a matrix of pixels, each with its own RGB color. The software for Reactive takes a digital image from a video camera and allows the pixels to live not only in their proper orientation (as particles on a grid), but to move freely in a virtual space. If viewers remain still, their images come into focus (as the "pixels" remain in their proper orientation). As viewers moves, however, the particles are released from the grid, and the sensation is that of wiping away one's image.

Reactive web site: www.shiffman.net/reactive.html

Presentation
Wednesday, 11 August
10:30 am - 12:15 pm
Room 404AB

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Remote Furniture

In this interactive public art project, two computer-controlled rocking chairs are installed on the floor facing each other. When two people sit in the chairs and rock, the chairs create an experience of communication through direct and tactile touch.

Life Enhancement
Remote Furniture was designed to create unexpected encounters between passersby in public spaces. Unlike Western cultures, people in Japan do not usually talk to people they meet in public spaces such as plazas or major streets. Although there are many public spaces in Japan, many built in post-war styles, Japanese do not have a tradition of actively using these spaces. We are still trying to adapt traditional attitudes toward space to those "imported" from other cultures.

Vision
This kind of interactive, haptic interface is easy to discuss from an engineering viewpoint. But how such technology can affect everyday life has not been well examined. Remote Furniture focuses attention on this area.

For the current version, modified rocking chairs were enhanced with a sensor and an embedded motor. The next step will be to connect two or three chairs through the internet, so that participants in different locations can interact with each other over long distances.

Goals
It was interesting to see what happened when Remote Furniture was installed in some Japanese public spaces, such as an underground passage or an indoor shopping mall. Because the objects were chairs, passersby became curious about them and eventually started sitting on them, rocking them, and playing with them. And when people realized what was going on between the chairs, they began communicating with each other in funny and tactile ways.

More conservative means of communication, such as talking and gesturing, became more available in public because the chairs allowed them to face each other as they do in familiar situations (for example, when they talk over a coffee table in a cafe or a kitchen table at home).

Some people even tried to develop ways of playing through this means of communication. Remote Furniture seemed to help remove shyness in public spaces. It reveals the unseen potential of public spaces and provides an experience of communicating to people who have not experienced it before.

I think this is the potential of public art.

Innovations
The two chairs have a tilt sensor and a linear motor, and are connected to a PC running control software. When someone rocks one of the chairs, the tilt sensor detects the inclination and transmits the data to the other chair through the PC. The motor in the other chair then causes it to rock.

Usually, this kind of remote interaction is designed with a master-slave (one-way) method. But in Remote Furniture, full duplex (two-way) interaction is realized, because it feels more natural.

Presentation
Monday, 9 August
8:30 - 10:15 am
Room 404AB

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Snared Illumination

Light reflecting off nanotechnology chips generates images in large-field display devices, yet this magic remains all but invisible to its end users. This project subtly, yet memorably, reveals the nature and capabilities of this new generation of micro-machined optical devices.

Life Enhancement
Conventional wisdom assumes that such fleeting images should not be perceptible, but this project shows that rapid eye motion enables image revelation in a subtle and whimsical way. In this simple, quick, yet engaging, perceptual experience, SIGGRAPH 2004 attendees can envision the imaging technologies that will disappear into the fabric of lights and cameras that will envelop the future world. Understanding how these invisible technologies work will help the SIGGRAPH community conceive other applications and transfer the technologies to other areas, such as film, industrial robotics, machine vision, and machine learning.

Vision
This project illustrates the changing nature of graphics and imaging as they progress toward active illumination and changing patterns that help cameras and other sensors interpret their surroundings. This is a shift away from just making images for people to see and admire toward making images machines can make use of. Invisible structured lighting will be a theme over the next few years as adaptive illumination is used to enrich the data gathered by cameras.

Goals
The ultimate goal is to master the use of light, sound, chemistry, mechanics, and narrative to build a bridge between bits and bodies. Snared Illumination demonstrates the technology and the unique nature of the human as a perceptual being.

Innovations
Fakespace Labs has been creating extremely fast time-sequential displays since 1996. Our latest work is based on the Texas Instruments Digital Micromirror Display, a nanotechnology optical device that is capable of switching pixels on and off at roughly 8 kHz rates. Until now, there has been no interface to enable pixel-level control at real-time rates or with arbitrary input. We have created a custom field programmable gate array and associated electronics that interface to TIÕs newly available Discovery boards with standard graphics interfaces. To allow for the required rapid data-transfer rates, we use standard graphics cards in a novel way: as a rapid data bus for 2kHz images formatted as raw data to the electronics. Previously, fixed-pattern sequence interfaces have been created (by our group and others) for use as structure light devices for rapid scanning. Our new approach and associated hardware are unique.

Snared Illumination also includes descriptions of new applications that employ this technology. For example, we are creating a system to display multiple images rapidly on a single common surface. Users wear special glasses that are clear for only a short moment every 60Hz. With such a system, many users can refer to a common map, with each user seeing different overlaid annotation. This allows for collaboration, cooperation, and communication for large and small groups of users. For example, the entire assembly of the United Nations could see a co-located projected display, with each delegate reading the text in a different language. We are also creating a system that uses a single projector and camera to both scan and project distortion-corrected imagery on a deformable surface.

Presentation
Monday, 9 August
10:30 am - 12:15 pm
Room 404AB

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Sound Flakes

Sound Flakes is interactive art for all ages. When faucets "Do, Re, Mi" are turned, sound drips into the water pool, where it floats as "flakes" of sound. Users can stir them or scoop them up with a ladle.

Life Enhancement
This artwork is a plaything for children. For adults, it is also a way to spend relaxed, inefficient time. For all ages, it generates smiling faces.

Vision
I hope that new computer-based tools can make people happy. This project uses art to promote happiness among people who use it. And it shows how artists can use new tools and concepts for joyful expression.

Goals
Sound Flakes could be exhibited in art museums or other public spaces, where it would create pleasant feelings associated with a slower rhythm of life, much like a fountain or a thoughtful sculpture.

Innovations
The display provides a real feeling of touching an image, without touching any special equipment. Images from a motion-capture system are projected on the captured space at full size. Faucets, ladles, and a pool of water are combined to intermingle artificial feedback (floating images of flakes, MIDI sounds) and non-artificial feedback (tactile sensations, sound, and visual information from real water and toys). The furniture-like interface and simple toys make the systems accessible to everyone, without special training.

Presentation
Wednesday, 11 August
8:30 - 10:15 am
Room 404AB

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Swarm

Swarm is a real-time "painterly rendering" system created by using the pattern of flocking birds (from Craig Reynold's "Boids" model) as a constantly moving brush stroke.

Life Enhancement
Swarm is an interactive artwork that reflects the viewer's image in an abstract, animated portrait. It is meant to enhance the environment of public and private spaces.

Vision
Swarm is a digital artwork that examines the way we look at imagery made on the computer vs. imagery made by hand. How is the process of dripping paint on a canvas different from setting pixels on a screen? Can an algorithm become a tool for creating art? These questions led me to my experiments, and it is my hope that the result, Swarm, will change the way we think about images, computers, and art.

Goals
My goal was to create a screen-based artwork that evoked the feeling of something handmade. I wanted the simulated brushstrokes to appear to have a "human" touch. Also, because I wanted the work to be a less "in-your-face" graphics experience, I made sure that the "painting" process was gradual, so the screen imagery changes slowly over time.

Innovations
Painterly rendering is an emerging field of research in computer graphics. I've developed a simple system that requires very little computation (and therefore processing power) to create such an effect in real time. In addition, this system shows the generative painting process in real time. Only the parts of the screen where the swarm currently lives are updated.

After researching how to implement Craig Reynolds' "Boids" model for flocking behavior, I wrote the software for Swarm in C++ (Windows and Macintosh).

Swarm web site: www.shiffman.net/swarm.html

Presentation
Wednesday, 11 August
10:30 am - 12:15 pm
Room 404AB

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Swimming Across the Pacific

In this virtual swimming apparatus, a swimmer is suspended in a swimming cage wearing a hang-gliding harness, a head-mounted-display, and eight tracking sensors. When the apparatus is installed in an airplane flying across the Pacific Ocean, a performer will swim for the entire duration of the flight, and the plane, a bubble of non-time and non-space, will become a collaborative artistic space.

Life Enhancement
Swimming across the Pacific is a compelling swimming experience that enhances life in four main areas:

1. Entertainment. The sensation of swimming in virtual water while suspended in air is highly enjoyable.
2. Sports. The simulated swimming requires exertion of energy to move through the space.
3. Education. With this apparatus, people who are afraid of the water can learn to swim and enjoy the pleasures of body movement while floating.
4. Art. This project is part of a larger artwork. The sense of suspended space and time conveyed by the apparatus is an important component of the overall project. The artwork is intended to introduce a new era of collaborative artistic space through the activity of swimming across the Pacific.

Vision
The current state of the apparatus permits one person to experience virtual swimming fully immersed in an aquatic environment. The system projects a bird's eye view of the swimmer in the virtual world for the audience to see. An odometer in the scene shows the swimmer's speed and current location above the virtual Pacific Ocean.

The swimming interface offers a new way to explore knowledge bases. Although this swimming apparatus moves in virtual water, it could be used to move in data spaces that use other liquids as metaphors. Using the body as a natural navigation device can dramatically heighten one's sense of scale, distance, meaning, and even self-awareness. Expending energy at a body-scale level may allow a person to understand how objects relate to each other in that frame of reference. A swimming locomotion interface, therefore, provides a thought-provoking method of exploration, even though the current design focuses on swimming from Los Angeles to Tokyo.

Goals
In addition to creating a fun, immersive device that simulates swimming as closely as possible, we plan to use this apparatus in our research on active control of dynamic simulations for locomotion (using motion capture systems for animation). We plan to use the device to control dynamic simulations of swimming motions.

Innovations
The full-body locomotion apparatus for virtual swimming on a water surface is innovative, especially the mechanical techniques that provide a good sense of floating in water. The water splashing algorithm is also innovative and helps to make the visualization of swimming more interesting for both swimmer and audience.

Complete project information: hct.ece.ubc.ca/research/sap/

Presentation
Sunday, 8 August
1:45 - 3:30 pm
Room 404AB

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Nagoya Institute of Technology

Tickle Salon

Stretch out and relax, while a robot gently tickles and strokes your skin.

Life Enhancement
Many people appreciate gentle skin stimulation and find it very enjoyable. Tickle Salon induces feelings of relaxation, well-being, and improved body awareness.

Vision
Human culture is now facing the rise of machines. We are confronted with more and more complex devices that appear to have lives of their own, making their own plans, behaving autonomously. Many people feel uncomfortable when confronted with machines that are not purely slaves any more. The Tickle Salon robot also has a will of its own, but it is friendly, not frightening, and may stimulate friendship between humans and machines. The next step will be to achieve higher levels of man-machine symbiosis.

Goals
Automated tickling is an exciting topic because it brings together our interests in meta creativity, biology, and artificial intelligence, and, of course, the pleasure of being tickled. Our goal is to create a machine that is able to generate bodily sensations that are normally considered out of the question in the context of robotics.

Innovations
Tickle Salon's core technical innovation is integration of robotic actuators and sensors into a simple and elegant, inexpensive, lightweight 3D system. The device is a new type of haptic system that collects information about its environment only by touching, and feeling its way around, adapting itself to whatever it encounters. The robot is blind, but it forms a mental map, which it uses to plan its motions.

The probe actuator/sensor, the "inverted pyramid" wire suspension, is a novelty. The suspension lines not only move the probe, they also serve as touch sensors. The probe does not contain any electronics; it is basically just mass, a metal ball "dressed in a skirt." The suspension lines are very thin and transparent, hardly visible, so that it seems as if the probe is free-floating in the air.

The stepper motors are controlled though custom-designed drive circuits. The control program runs on a computer with the Linux operating system. The control program is written from scratch, along with the low-level driver module that communicates with the robot hardware.

Presentation
Monday, 9 August
8:30 - 10:15 am
Room 404AB

Contacts
Erwin Driessens
Maria Verstappen
notnot@xs4all.nl

Time Follower's Vision

An innovative visual presentation system, Time Follower's Vision uses mixed-reality technology to produce a virtual image of a vehicle and its attitude.

Life Enhancement
This system enhances human abilities to control machines.

Vision
The ultimate goal is a practical application: a control interface for rescue robots.

Goals
In events like the Kobe Great Earthquake or the September 11 attack, where search and rescue of the victims must be carried out as quickly as possible, this visual presentation system could save lives. Even without a well-trained operator, if the robot's current position and environment can be displayed, the rescue operation can be performed more efficiently and effectively.

Innovations
The key innovation is application of imaged-based rendering and 3D graphics to produce a virtual rear viewpoint from a single camera, which improves maneuverability of robotic vehicles.

Presentation
Sunday, 8 August
1:45 - 3:30 pm
Room 404AB

Contact
Maki Sugimoto
The University of Electro-Communications
time_follower@hi.mce.uec.ac.jp

Contributors
Masahiko Inami
Georges Kagotani
Fumitoshi Matsuno
Hideaki Nii
Naoji Shiroma

Untethered Force Feedback Interface That Uses Air Jets

This is an untethered interface that eliminates the annoyance of wires and other connectors by using air jets to establish force feedback. Attendees experience interaction with a virtual object that responds to being "touched." The sense of touch is provided by air jets, while visual clues are provided by a projection-based stereo display.

Life Enhancement
Many devices created to realize force feedback demand the use of connecting wires and/or demand that the participant wear a heavy device. Both of these requirements disturb the user's free movement and raise the level of annoyance. Compared to the tools used in daily life, existing VR systems leave a lot to be desired. We focus on acceptance of VR systems, so we concentrate on eliminating anything that restrains the user. A tool will not become part of daily life if it is seen as an encumbrance. Our keyword is "untethered."

Vision
Provision of unencumbered touch will augment the sense of vision to make virtual environments an everyday occurrence. The most exciting new possibility provided by our system is its freedom in range of experience. For instance, we can imagine this system being installed in large areas or buildings to enrich user experience and establish interaction over extended distances. Multiple users can participate in the same game when nozzles are placed in strategic locations. Users can enjoy interaction with a virtual object while walking along a hallway. The area of a single array is not limited; some applications may require only one air jet, while others may need several hundred. This system is still quite primitive, and more research should yield an interface with better feel and less noise. Even in its present form, it provides an excellent indication of what is possible and VR's potential to enter daily life.

Goals
The prime goal is a force-feedback interface that dispenses with all tethers. Users need only red-and-blue 3D glasses and a lightweight paddle. This system does not constrain the user's activity, and it is comfortable.

Innovations
The major component is the force-feedback interface. The basic idea of this method is that air released from a jet impacts the "air receiver" (paddle) held by the user to provide force feedback.

The second component is the projection-based stereo display system. Stereo images are projected onto the top surface of the desk. The black air-jet holes on the surface are covered with simple flaps so that the stereo images projected on the desk are not degraded.

The third component is the optical position-tracking system. The user's 3D glasses and paddle have visual markers, and their positions and orientations are detected by two cameras.

These three components realize a completely wire-free interface. The system is completely devoid of user restraints.

Presentation
Tuesday, 10 August
10:30 am - 12:15 pm
Room 404AB

Contact
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NTT Cyber Solutions Laboratories
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Contributors
Satoshi Iwaki
Minoru Kobayashi
Akira Nakayama
Yoshihiro Shimada
NTT Cyber Solutions Laboratories

Location

Room 408AB

Days & Hours

Sunday, 8 August	1 - 6 pm
Monday, 9 August	9 am - 6 pm
Tuesday, 10 August	9 am - 6 pm
Wednesday, 11 August	9 am - 8 pm
Thursday, 12 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.

2D
An introduction to the world of 2D input and output. A wide array of computers loaded with industry-leading software will be color calibrated and color matched, via ICC workflow, to large-format printers to ensure superior results. Color-management training will be 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)
Attendees are introduced 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 and Kathy Beal).

A new area for exploring interactive multimedia features Cycling '74's Max/MSP/Jitter software and 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.

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.

Invited Technology
Polynomiography software allows attendees to input polynomial equations and turn them into visual images of enormous diversity and beauty. Polynomiography is analogous to painting or to photography: with practice anyone can become a polynomiographer.

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.

Guerilla Studio Presents: The Third Annual SIGGRAPH CyberFashion Show

Wednesday, 11 August 6:30 - 7:30 pm
Petree Hall D

What will the future of high-tech body adornment look like? Where will the machine end and the flesh begin? We invite you to come explore tomorrow, to glimpse a sneak preview of the future of fashion through today's cutting-edge projects, products, and prototypes.

The show features a wide variety of wearable computers, head mounted displays, smart clothes, luminous clothing & accessories, cyber club wear, and CAD/CAM jewelry & bodywear. A number of innovative new prototypes and some exciting world premier technologies promise to propel us into future realms of body-technology integration.

CyberFashion III is produced by:
isa gordon
artistic director of the Psymbiote Project

Alex Lightman
CEO of Charmed Technology

Guerilla Studio Committee

Peter Braccio
SIGGRAPH 2004
Guerilla Studio Chair
Monterey Bay Aquarium Research Institute

Travis Ball
LimeLite Media

Kathy Beal
kathybeal.com

Robert Berg
Arizona State University

Lyn Bishop
Artist

Rachel Braccio

John Brock
Environment Artist

DEvan Brown
Sensory Engineering

Chrissy Cain-Ramirez
Monterey Bay Aquarium Research Institute

Dan Collins
PRISM Arizona State University

Jon Cone
Cone Editions Press
inkjetmall.com

Gene Cooper
Arizona State University

Larry Danque
Cone Editions Press

Tara DeMarco

Chris Evans

Helen Golden
Creative Images by Helen Golden

Isa Gordon
Psymbiote Project / SintheteX Fashions

Bob Gould

Kathryn Hargreaves
Dangerous Curve

Byron Lahey
Arizona State University School of Art

Karl Lang

Amy Morie

Dave Nutty

Carolyn Ottmers
School of the Art Institute of Chicago

Susan Parker
Parker & Associates

Tim Quinn
Dangerous Curve

Brock Ramirez
Otis College of Art and Design

Manny Sepulveda
Integrated Color Solutions, Inc.

Cathy Sewell
Monterey Bay Aquarium Research Institute

Makai Smith
Venturi, Scott Brown and Associates

Raleigh Souther
Motion Graphix

Rebeca Strzelec
Pennsylvania State University Altoona

Chris Tome
3DVfX.net

Elona Van Gent
Grand Valley State University

Scott Van Note
PRISM Arizona State University

Kimberly Voigt
Temple University, Tyler School of Art

Chris Williams
Vivendi Universal

Michael Wright
Otis College of Art & Design, M Ragsdale Wright Studios

The Guerilla Studio wishes to thank Intel Corporation for their generous support.

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

Scott Lang
SIGGRAPH 2004 International Resources Chair
Bergen County Academies
scott_lang@siggraph.org

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Viveka Weiley
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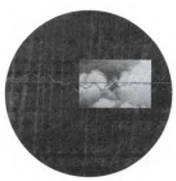
Ping Interactive Broadband pty. ltd.
s2004@ping.com.au

Location

South Lobby

Days & Hours

Saturday, 7 August	6 - 8 pm
Sunday, 8 August	8 am - 6 pm
Monday, 9 August	8 am - 6 pm
Tuesday, 10 August	8 am - 6 pm
Wednesday, 11 August	8 am - 6 pm
Thursday, 12 August	8 am - 5 pm



International Events

Informative international sessions on the current state of computer graphics around the world organized by representatives of ACM SIGGRAPH-affiliated societies and the worldwide computer graphics Industry.

Sunday, 8 August

10 am - noon

Overview of SIGGRAPH 2004 for Japanese Attendees (with Japanese interpreter)

SIGGRAPH 2004 committee chairs present an overview of the conference and highlights of their programs.

Noriko Namikoshi
Digital Content Association of Japan
namikoshi@dcaj.or.jp

Ayumi Miyai
Computer Graphic Arts Society
SIGGRAPH 2004 International Resources Committee
miyai@cgarts.or.jp

Midori Kitagawa
Advanced Computing Center for the Arts and Design
SIGGRAPH Japanese Liaison
midori@accad.ohio-state.edu

Miho Aoki
University of Alaska Fairbanks
SIGGRAPH 2004 International Resources Committee
ffma2@uaf.edu

Monday, 9 August

1 - 2 pm

Introduction to Japanese and Asian Digital Content Trends

The 19th Digital Content Grand Prix Video Show presents all the prize-winning productions of the last year from Japan, Korea, Taiwan, and Canada. Also: the most advanced CG-content business models using broadband infrastructure in Japan: Virtual Biosphere (an interactive illustrated book) and High-Definition Music Generation Tool Using Matrix.

Noriko Namikoshi
Digital Content Association of Japan
namikoshi@dcaj.or.jp

2 - 3 pm

Introduction of Creators Lounge

3D Consortium, which was established in March 2003 to promote stereoscopic technologies and products, has started a virtual lounge on the web for creators. This presentation outlines the objectives and activities of the lounge.

www.3dc.gr.jp/creatorslounge/

Noriko Namikoshi
Digital Content Association of Japan
namikoshi@dcaj.or.jp

3 - 4 pm

German Speakers Get-Together

Informal get-together of the German speaking attendees and contributors at SIGGRAPH 2004; an invitation to the international business community to make business contacts with German speakers (mainly from Germany, Switzerland, and Austria) and for German speakers to network, exchange ideas, and discuss business opportunities.

Christian Bauer
SIGGRAPH 2004 International Resources Committee
chris@well.com

4 - 5:30 pm

Panel Discussion: Looking Towards the United Nation's World Summit on the Information Society '05: Strategies, Expectations and Goals

In November 2005, the United Nations will host the World Summit on the Information Society in Tunis, Tunisia and present again the World Summit Award, a non-profit initiative to identify best practices in e-content and multimedia and beyond. SIGGRAPH 2004 attendees are invited to discuss the summit meeting and contribute to its achievements.

Moderator
Christian Bauer
SIGGRAPH 2004 International Resources Committee
chris@well.com

Panelists
Lynn St. Amour
President Internet Society - ISOC
Peter A. Bruck
CEO Austrian Research Studios
United Nation's World Summit on the Information Society (WSIS) Representative

5:30 - 6 pm

Networking Session

Our thanks to ICNM, Salzburg, for sponsoring this event.

Tuesday, 10 August

1 - 3 pm

Korean Attendees Meeting

An informal gathering for Korean attendees. All are welcome to attend including those from the industry, art, and research areas.

Korea Computer Graphic Society
hwajinpk@sookmyung.ac.kr

3 - 4 pm

GRAPHITE 2004 Conference Presentation

A presentation on the Graphite conference held in Singapore 15-18 June 2004. It will also show the Electronic Theater reel produced for the conference and show a preview of the next Graphite in New Zealand in 2005.

Lee Yong Tsui
MYTLEE@ntu.edu.sg

4 - 5 pm

SEAGRAPH

This meeting is for delegates from Southeast Asian countries, and in a wider context, Asian countries. SEAGRAPH is the Southeast Asia Computer Graphics Association, formed to bring computer graphics professionals and enthusiasts together. 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. We will discuss how we can help each other and channel our immense energy to promote computer graphics activities.

Lee Yong Tsui
MYTLEE@ntu.edu.sg

5 - 6 pm

ANZGRAPH (Australia and New Zealand Graphics Association)

Members of ANZGRAPH present details of their activities during the past year, including highlights of the very successful Graphite 2004, held in Singapore in June 2004 and information on Graphite 2005.

Matt Adcock
ANZGRAPH
MattAdcock@csiro.au

Wednesday, 11 August

noon - 1 pm

SIGGRAPH 2005 International Resources Information Session

Are you interested in volunteering for the SIGGRAPH 2005 International Resources Committee? Maybe you'd like to help publicize the conference in your city or country. Or maybe you'd just like to make some suggestions or recommendations about international services for SIGGRAPH 2005. Whatever your level of interest, please join us in the International Center and meet the SIGGRAPH 2005 International Resources Chair.

3 - 4 pm

AFRIGRAPH (African Graphics Association)

Members of AFRIGRAPH present details of their recent activities along with information about AFRIGRAPH 2004 in Stellenbosch, November 2004.

James Gain
jgain@cs.uct.ac.za

Alan Chalmers
alan.chalmers@bris.ac.uk

4 - 5 pm

Insight into CG and Animation in India

Current information about the CG and animation industry in India presented by top studio recruiters and industry professionals. In addition to profiling the work done by several animation studios, the session looks at the emerging co-production trend as one of the most effective and viable ways to expand an animation facility's business potential.

Prasad Phadke
prasad.phadke@bbtek.org

5 - 6 pm

Indian Attendees Networking Session

An informal get-together of Indian attendees and contributors, and an opportunity for the international community to make contacts with Indian speakers and for Indian speakers to network, exchange ideas, and discuss collaborative opportunities.

Prasad Phadke
prasad.phadke@bbtek.org

GraphicsNet

The intra-connection among all SIGGRAPH 2004 programs and events, and the gateway to the global graphics community. GraphicsNet is built on gigabit fiber and FastEthernet (100Mbs) links connecting the presentation rooms for Courses, the Educators Program, Emerging Technologies, Panels, Papers, Sketches, Special Sessions, and Web Graphics. A DS3 circuit connects the conference to the internet.

SIGGRAPH 2004 provides wireless Ethernet links in most areas of the Los Angeles Convention Center. To use the wireless links, attendees should have their own wireless (802.11b) cards.

GraphicsNet Committee

Ed Konowal
SIGGRAPH 2004 GraphicsNet Chair
Lee County School District

Carlos Cardenas
Tyco Electronics M/A-Com

Joseph M. Cychosz
SIGGRAPH 2005 GraphicsNet Chair
Purdue University NCN/INAC

Jodi Giroux
Scarsdale Public Schools

Larry Kauffman
Sallie Mae, Inc.

Swaroop R. Shivarajapura
Purdue University, CADLAB

David Spoelstra
MediaMachine

Steve Van Frank
Van Frank Consulting

Pathfinders

Get acquainted with the full range of possibilities at SIGGRAPH 2004. Learn what's new and amazing this year. If you need information, consultation, or expert recommendations, talk with a veteran SIGGRAPH mentor at the Pathfinders booth.

Do you have a question about what to see, how to make the best use of your time at the conference, or what sessions best fit your professional interests? Ask the veteran SIGGRAPH-conference attendees at Pathfinders for navigation tips.

Pathfinders is here to help you maximize your conference experience. Perhaps you want to know what sessions you can attend at your level of conference registration, or which sessions will support your career interests. At the Pathfinders booth, all questions are welcome. We know the answers, or we know where to find them.

Location

South Lobby

Days & Hours

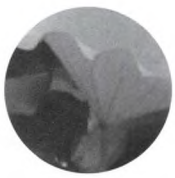
Saturday, 7 August	6 - 8 pm
Sunday, 8 August	8 am - 6 pm
Monday, 9 August	8 am - 6 pm
Tuesday, 10 August	8 am - 6 pm
Wednesday, 11 August	8 am - 6 pm
Thursday, 12 August	8 am - 5 pm

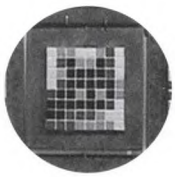
Pathfinders Committee

Scott Lang
SIGGRAPH 2004 Pathfinders Chair
Bergen County Academies

Lou Harrison
North Carolina State University

Mary Nichols
Middle Tennessee 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. Check the Birds of a Feather sign-up board in West Lobby, or contact:

3D Printing for Scientific Visualization
Michael Pique
mp@scripps.edu

3D Scanning, Processing, and Display
Lars Nyland
nyland@mines.edu

3D User Interfaces
Doug Bowman
bowman@vt.edu

ACCAD Alumni Reception
Elaine Smith
elaine@accad.osu.edu

ACM Carto BOF
Theresa-Marie Rhyne
tmrhyne@ncsu.edu

ACM SIGGRAPH Public Policy Roundtable 2004
Myles Losch
dnagel@webtv.net

Blender Artist Showcase
Ton Roosendaal
ton@blender.org

Blender Course: Seeing is Believing!
Ton Roosendaal
ton@blender.org

Blender.org Community Meeting
Ton Roosendaal
ton@blender.org

Building 3D Web Environments to Archive Digital Art
Mike Libonati
mikelib@juno.com

CAD Working Group
Juilan Gomez
jeg@polished-pixels.com

Christians in Animation
Aaron Dennis
aaron@a-d-studio.com

CinePaint
Robin Rowe
rower@movieeditor.com

Component Based Visualization
Michael Sanner
sanner@scripps.edu

Computer Graphics Research for Undergraduates
William Joel
joelw@wcsu.edu

The Designer's Augmented Reality Toolkit (DART)
Blair MacIntyre
blair@cc.gatech.edu

Developing LEGO CAD Software
Orion Pobursky
billthefish@yahoo.com

DIVERSE: Open-Source VR and Simulation API
John Kelso
kelso@nist.gov

EQUINOX-3D User Developer Meeting
Gabor Nagy
gabor1@equinox3d.com

Film & Digital Cinema Color BOF & Hint-Fest
Joseph Goldstone
joseph@lp.com

The Future of the SIGGRAPH Conference
G. Scott Owen
owen@siggraph.org

Game Developers BOF
Liz Wakefield
liz@igda.org

ISEA Information Meeting
Cynthia Beth Rubin
info@isea-web.org

Khronos Group Overview: News and Updates on Four APIs
Briana Marrow
briana@goldstandgroup.com

Massively Parallel Graphics and Visualization
Patricia Crossno
pjcross@sandia.gov

Medical Working Group of the Web3D Consoritium
Sandy Ressler
sressler@nist.gov

Molecular Graphics
Michael Pique
mp@scripps.edu

Next Generation User Interface Technology for Consumer Electronics
Garry Paxinos
pax@usdtv.com

OpenGL ES Updates for Press and Developers
Briana Marrow
briana@goldstandardgroup.com

OpenML Updates for Press and Developers
Briana Marrow
briana@goldstandardgroup.com

OpenSG BOF
Dirk Reiners
dirk@opensg.org

Open Media Accelator Standards Launch
Briana Marrow
briana@goldstandardgroup.com

Open Scene Graph BOF
Don Burns
don@andesengineering.com

Open Source Technologies for Java Game Development
Athomas Goldberg
Athomas.goldberg@sun.com

Open Vector Graphics Standard Lunch
Briana Marrow
briana@goldstandardgroup.com

OZONE-Art, A-Life, Archaeology, Animation
Kevin Cane
kevin@pelleas.org

Professional & Student Chapters Startup Meeting
Thierry Frey
frey@siggraph.org

Purdue University Reunion
Jim Sprinkles
jsprink@purdue.edu

Quantum Computing and the Future of Computer Graphics
Marco Lanzagorta
marco.lanzagorta@nrl.navy.mil

Sharing Ideas in Teaching 3D Animation
Richard Lapidus
lapidus@morainevalley.edu

SIGGRAPH Conference Contributor Recognition Forum
Thierry Frey
thierry_frey@siggraph.org

SIGGIG-Gays in Graphics
Bob Sumner
sumner@csail.mit.edu

SPEC/GPC Press Conference
Erin Hatfield
erinh@cramco.com

UNC Chapel Hill Reunion
Anselmo Lastra
lastra@unc.edu

Verse
Eskil Steenber
eskil@obession.se

VES Annual Member Meeting
Eric Roth
eric@visualeffectssociety.com

Virginia Commonwealth University Reunion
Pamela Turner
ptturner@vcu.edu

Virtual LEGO: Intro to Free 3D Modeling Software
Tim Courtney
tim@ldraw.org

VR Juggler BOF
Aron Bierbaum
aronb@vrac.iastate.edu

Web3D Member Meeting
Leonard Daly
daly@realism.com

X3D Programmable Shaders Working Group Meeting
Goncalo Nuno Moutinho de Carvalho
c3099023@tees.ac.uk

YLEM Goals and Directions
Loren Means
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Hotels & Map

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+1.213.484.2769 fax

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+1.213) 892.8686 fax

Hilton Checkers
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+1.213.626.9906 fax

Holiday Inn Downtown
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Los Angeles, California 90017
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+1.213.628.1201 fax

Holiday Inn Los Angeles City Center
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Los Angeles, California 90015
+1.213.748.1291
+1.213.748.6028 fax

Hotel Figueroa
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Los Angeles, California 90015
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+1.213.689.0305 fax

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+1.213.629.3230 fax

Kawada Hotel
200 South Hill Street
Los Angeles, California 90012
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+1.213.687.4455 fax

Los Angeles Marriott Downtown
333 South Figueroa Street
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+1.213.613.0291 fax

Millennium Biltmore Hotel
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+1.213.612.1545 fax

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328 East First Street
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+1.213.617.2700 fax

New Otani Hotel & Garden
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Los Angeles, California 90012
+1.213.617.3300
+1.213.667.3399 fax

Quality Inn & Suites Downtown
1901 West Olympic Boulevard
Los Angeles, California 90012
+1.213.385.7143
+1.213.385.5808 fax

Radisson Wilshire Plaza
3515 Wilshire Boulevard
Los Angeles, California 90010
+1.213.381.7411
+1.213.386.7379 fax

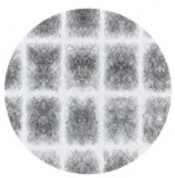
Ramada Inn Los Angeles
611 South Westlake Avenue
Los Angeles, California 90057
+1.213.483.6363
+1.213.483.0088 fax

Ritz Milner Hotel
813 South Flower Street
Los Angeles, California 90017
+1.213.627.6981
+1.213.623.9751 fax

Vagabond Inn
3101 South Figueroa Street
Los Angeles, California 90045
+1.213.746.1531
+1.213.746.9106 fax

Westin Bonaventure Hotel & Suites
404 South Figueroa Street
Los Angeles, California 90071
+1.213.624.1000
+1.213.612.4800 fax

Wilshire Grand Hotel
Headquarters
930 Wilshire Boulevard.
Los Angeles, California 90211
+1.213.628.7777
+1.213.612.3989 fax

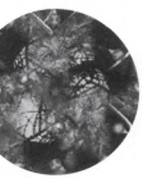


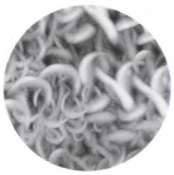
Accommodations

Downtown Los Angeles

A 10.5% tax per night is added to all hotel bills in Los Angeles. Room occupancy taxes are subject to change. Early departure fees may apply. Prices listed are per night.

★ Headquarters: Wilshire Grand Hotel
1 Best Western Mayfair Hotel
2 Downtown LA Standard
3 Hilton Checkers Hotel
4 Holiday Inn Downtown
5 Holiday Inn Los Angeles City Center
6 Hotel Figueroa
7 Hyatt Regency Los Angeles
8 Kawada Hotel
9 Los Angeles Marriott Downtown
10 Millennium Biltmore Hotel
11 Miyako Hotel Los Angeles
12 New Otani Hotel & Garden
13 Omni Los Angeles Hotel
14 Quality Inn & Suites Downtown
15 Radisson Wilshire Plaza
16 Ramada Inn Los Angeles
17 Ritz Milner Hotel
18 Vagabond Inn
19 Westin Bonaventure





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 2004 ACM student membership rate

OR

- The name and confirmation number of an advisor, who is already registered for SIGGRAPH 2004, who can verify your student status.

Note: Your badge will include your name, organization, city, state, and country as indicated on your registration form.

Registration

Hall G

Saturday, 7 August	6 - 8 pm
Sunday, 8 August	8 am - 6:30 pm
Monday, 9 August	8 am - 6:30 pm
Tuesday, 10 August	8 am - 6:30 pm
Wednesday, 11 August	8 am - 6:30 pm
Thursday, 12 August	8 am - 3 pm

Media Headquarters

Room 301

Saturday, 7 August	5 - 7 pm
Sunday, 8 August	8 am - 4 pm
Monday, 9 August	8 am - 5 pm
Tuesday, 10 August	8 am - 5 pm
Wednesday, 11 August	9 am - 5 pm
Thursday, 12 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 2004. Preview the Computer Animation Festival and receive insight into the SIGGRAPH 2004 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
Room 411
Tuesday, 10 August
8:15 - 8:45 am

Early Exhibition Floor Access
Exhibit Floor
Tuesday, 10 August
9 - 10 am

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, Experiences, Services, and Documentation Included With Your SIGGRAPH 2004 Registration

Presentations

●	Courses
●	Papers
●	Panels
●○	Sketches
●○○	Posters
●○	Web Graphics
●○	Educators Program
●○○	Keynote Address/Awards
●○	Special Sessions
●○○	Special Event
●○○	Exhibitor Tech Talks

Experiences

●○○	Art Gallery
	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
●○○	Pathfinders

Documentation

●	ACM *Transactions on Graphics* (Conference Proceedings special issue)
●	Full Conference DVD-ROM
●○	Electronic Art & Animation Catalog
○	Conference Select CD-ROM

Attendee Services

SIGGRAPH 2004 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: **+1.213.743.711.**

Los Angeles Convention Center
1201 South Figueroa Street
Los Angeles, California 90015

Airport Shuttle

Prime Time Shuttle offers SIGGRAPH 2004 attendees a discount of $2 to and/or from Los Angeles International Airport. Coupons can be found on the web site at:
www.siggraph.org/s2004/travhouse

Coupons should be presented to a Prime Time 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. For more information, call: **800.RED.VANS.**

Audio/Visual Services

+1.213.743.7103
Complete audio/visual services for SIGGRAPH 2004 presenters are available in the Speaker Prep Room, West Hall A, **+1. 213.765.4216.**

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
USA Host offers baggage check service for briefcases, backpacks, and other small items during conference hours for $2 per bag. For overnight storage the charge is $5 per bag. SIGGRAPH 2004 is not repsonsible for items provided to Baggage Check.

South Lobby (near Pico Drive Entrance)

Sunday, 8 August	8:30 am - 7:30 pm
Monday, 9 August	7:30 am - 6:30 pm
Tuesday, 10 August	7:30 am - 6:30 pm
Wednesday, 11 August	7:30 am - 6:30 pm
Thursday, 12 August	7:30 am - 6:30 pm

West Hall Lobby

Wednesday, 11 August	7:30 am - 6:30 pm
Thursday, 12 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, Suite 604, 6th Floor of the Westin Bonaventure Hotel (+1.213.624.3693). They are both available for any banking/currency exchange needs you may have during your stay in Los Angeles.

Beaming Station

Hall G
The SIGGRAPH 2004 beaming station is in the Los Angeles Convention Center registration area. Update your Palm OS or Pocket PC device with complete information about the conference and exhibition.

Bookstore

West Lobby and Hall G
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 2004 speakers and award winners. Most prices are discounted 10 percent for SIGGRAPH 2004 attendees.

Sunday, 8 August	9 am - 7 pm
Monday, 9 August	8 am - 6 pm
Tuesday, 10 August	8 am - 6 pm
Wednesday, 11 August	8 am - 6 pm
Thursday, 12 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 2004.

Bruce Sterling at the Bookstore
Meet SIGGRAPH 2004's Keynote Speaker
Bookstore, West Lobby
Monday, 9 August, 3:45 - 4:45 pm

See the schedule in the bookstore for other book signings throughout the week.

Business Center (USA Host)

Concourse Hall Walkway
+1.213.741.1151 ext. 5520
The USA Host offers computer time rental, fax, services, photocopying, office supplies, phone cards, wireless cards and US stamps.

Saturday	7 am – 7 pm
Sunday, 8 August	7 am – 7 pm
Monday, 9 August	7 am – 7 pm
Tuesday, 10 August	7 am – 7 pm
Wednesday, 11 August	7 am – 7 pm
Thursday, 12 August	7 am – 7 pm

Busing

See Shuttle Services.

Child Care

Room 518

KiddieCorp provides age-appropriate child care activities for children from ages six months to 17 years of age at the Los Angeles Convention Center. Children must be registered for a minimum of three consecutive hours. Individualized evening child care is also available on a limited, first-come, first-served basis. KiddieCorp staff is certified in infant and child CPR. Child care services are guaranteed to be available during the following hours:

Sunday, 8 August	noon - 6 pm
Monday, 9 August	9 am - 6 pm
Tuesday, 10 August	9 am - 6 pm
Wednesday, 11 August	9 am - 6 pm
Thursday, 12 August	9 am - 5 pm

Conference Management Office

Room 304AB
+1.213.743.7111

If you have questions regarding SIGGRAPH 2004, call or stop by this office anytime during conference hours.

Exhibition Management Office

Room 303AB
+1.213.743.7100

Exhibition Management representatives are available during conference hours to meet with exhibitors and help with plans for exhibiting at SIGGRAPH 2004.

Exhibitor Registration

Hall G

Open during registration hours. See Registration.

First Aid Office

South Lobby (around corner near Pico St. exit)
Nurses and paramedics are on duty during conference hours.

Food Services

Restaurants: Compass Café (South Lobby) and Galaxy Food Court (West Hall)

The Los Angeles Convention Center operates several snack stands, food carts, and restaurants throughout the convention center.

Compass Café (South Lobby)

Saturday, 7 August	9 am - 3 pm
Sunday, 8 August	8 am - 4 pm
Monday, 9 August	8 am - 6:30 pm
Tuesday, 10 August	8 am - 6:30 pm
Wednesday, 11 August	8 am - 6:30 pm
Thursday, 12 August	8 am - 6:30 pm

Galaxy Food Court (West Hall)

Sunday, 8 August	8 am - 6 pm
Monday, 9 August	8 am - 6 pm
Tuesday, 10 August	8 am - 6 pm
Wednesday, 11 August	8 am - 6 pm
Thursday, 12 August	8 am - 6 pm

Housing Desk

Hall G
+1.213.765.4205

Complete information about SIGGRAPH 2004 hotel accommodations. Open during registration hours. See Registration.

Information Desk

South Lobby

Complete information on conference programs and events, the convention center, and what to see and do in Los Angeles. Open during registration hours. See Registration.

International Center

South Lobby
+1.213.765.4204

The SIGGRAPH 2004 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, 7 August	6 - 8 pm
Sunday, 8 August	8 am - 6 pm
Monday, 9 August	8 am - 6 pm
Tuesday, 10 August	8 am - 6 pm
Wednesday, 11 August	8 am - 6 pm
Thursday, 12 August	8 am - 5 pm

Internet Access Kiosks

Hall G

Wireless Internet Access

802.11b access is available in most areas of the Los Angeles Convention Center. Some SIGGRAPH 2004 presentations offer audience participation via wireless.

Please refer to your laptop operating system and client adapter documentation to:

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 "SIGGRAPH."
4. Disable encryption on your wireless adapter.

The SIGGRAPH 2004 wireless network provides open, unencrypted communications for conference attendees. The system is not secure and can be monitored by others.

Job Fair

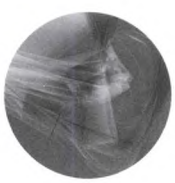
Room 403

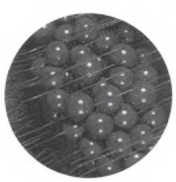
Tuesday, 10 August	10 am - 4 pm
Wednesday, 11 August	noon - 4 pm

The Art Institutes are sponsoring the ACM SIGGRAPH 2004 Job Fair for the leading companies in all related ACM SIGGRAPH fields to discuss employment opportunities with thousands of SIGGRAPH 2004 attendees in a relaxed, informal setting. The Job Fair is open to all SIGGRAPH 2004 attendees at no additional cost.

Job Fair Participants (as of 6 July, 2004)

Activision	Santa Monica, California
The Art Institutes	Pittsburgh, Pennsylvania
ATI Technologies Inc.	Markham, Ontario, Canada
CG Staff	San Francisco, California
Double Negative Visual Effects	London, England
Dynamic Animation Systems	Fairfax, Virginia
ESC Entertainment	Alameda, California
Forma	Irvine, California
greenlightjobs	Los Angeles, California
High Voltage Software	Hoffman Estates, Illinois
Imaginary Forces	Hollywood, California
Intel – Software Engineering	Folsom, California
International Game Technologies	Reno, Nevada
Neversoft Entertainment	Woodland Hills, California
Nextengine, Inc.	Santa Monica, California
Papaya Studios Corporation	Irvine, California
Sammy Studios	Carlsbad, California
Savannah College of Art and Design	Savannah, Georgia
Universal Creative	Orlando, Florida
Universal Parks & Resorts	Orlando, Florida
Vicarious Visions	Troy, New York






Lost and Found

South Hall

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: Hall G.

Merchandise Pickup Center

Hall G

Your conference documentation (included with registration) must be picked up at the Merchandise Pickup 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, 7 August	6 - 8 pm
Sunday, 8 August	8 am - 6:30 pm
Monday, 9 August	8 am - 6:30 pm
Tuesday, 10 August	8 am - 6:30 pm
Wednesday, 11 August	8 am - 6:30 pm
Thursday, 12 August	8 am - 6 pm

Message Center

South Lobby

+1.213.765.4200

Kiosk where attendees leave and retrieve notes and requests.

Parking

West and South Halls

+1.213.741.1151 ext. 5850

SIGGRAPH 2004 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 2004 function.

Pathfinders

South Lobby

Special assistance for first-time SIGGRAPH conference attendees. Let us help you navigate your way through SIGGRAPH 2004. Feedback always welcome at: **pathfinder@siggraph.org**

Registration

Hall G

Saturday, 7 August	6 - 8 pm
Sunday, 8 August	8 am - 6:30 pm
Monday, 9 August	8 am - 6:30 pm
Tuesday, 10 August	8 am - 6:30 pm
Wednesday, 11 August	8 am - 6:30 pm
Thursday, 12 August	8 am - 3 pm

Special Assistance Desk

Hall G

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 Desk

South and West Hall

Concierge services for reservations at Los Angeles restaurants and clubs.

Sunday, 8 August	Noon - 5:30 pm
Monday, 9 August	10:30 am - 6:30 pm
Tuesday, 10 August	9:30 am - 6:30 pm
Wednesday, 11 August	9:30 am - 6:30 pm
Thursday, 12 August	9:30 am - 6:30 pm

Shipping Desk

Hall G

Complete shipping services for your merchandise, course notes, and other conference materials. The shipping desk provides next-day air, second-day air, and regular ground shipping services to destinations throughout the world. The shipping desk is open during registration hours.

Shuttle Service

+1.213.308.9590

SIGGRAPH 2004 provides limited complimentary shuttle service between most conference hotels, the Los Angeles Convention Center, and to/from the SIGGRAPH 2004 reception. No shuttle service will be provided to/from the hotels and LACC during the afternoon hours (schedule provided below). 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 Hotel Figueroa and the Holiday Inn Los Angeles City Center are considered "walk" hotels 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 +1.213.308.9590. SIGGRAPH 2004 provides buses with wheel chair lifts and tiedowns.

Saturday, 7 August	5 pm - 8:30 pm
Sunday, 8 August	7:30 am - 11 am 4:30 pm - 8:30 pm
Monday, 9 August	7:30 am - 11am 4:30 pm - 9:30 pm
Tuesday, 10 August	7:30 am - 11am 4:30 pm - 9:30 pm
Wednesday, 11 August	7:30 am - 11 am 4:30 pm - 9:30 pm
Thursday, 12 August	7:30 am - 11 am 3 pm - 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 be at South Hall on Pico Drive of the LACC.

Shuttles for Reception

Pershing Square, Olive and 6th Streets
8 - 10 pm

Shuttles begin transporting from all hotels 30 minutes before the reception start. The last shuttle will depart from Pershing Square at 10:30 pm. Shuttles will transport attendees staying at the "walk" hotels (Hotel Figueroa and Holiday Inn Los Angels City Center) and the LACC to/from the reception.

SIGGRAPH 2004 Conference Presentation DVD-Rom Sets

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 Graphics, 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 2004 Conference Presentation DVD-Rom set stop by the Soma Media Booth located in the South and West Lobbies.

SIGGRAPH Store

South Lobby

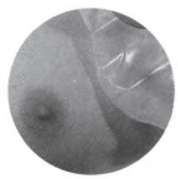
+1.213.765.4210

SIGGRAPH Boutique

West 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 2004 merchandise is available on a first-come, first-serve basis in the SIGGRAPH Store (South Lobby) or SIGGRAPH Boutique (West Lobby).

Saturday, 7 August	6 - 8 pm
Sunday, 8 August	8 am - 6:30 pm
Monday, 9 August	8 am - 6:30 pm
Tuesday, 10 August	8 am - 6:30 pm
Wednesday, 11 August	8 am - 6:30 pm
Thursday, 12 August	8 am - 6 pm



Speaker Prep Room

West Hall A
+1. 213.765.4216
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, 7 August	Noon - 7 pm
Sunday, 8 August	7 am - 7 pm
Monday, 9 August	7 am - 7 pm
Tuesday, 10 August	7 am - 7 pm
Wednesday, 11 August	7 am - 7 pm
Thursday, 12 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 2004. 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, Special Sessions, and Web Graphics, programs; 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 2004 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, Sketches, Special Sessions, and Web Graphics. 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 2004 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

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, 7 August. 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 Ticket
Reception tickets are also available at this counter. The cost is $40 per person. All sales are final.

Telephone Numbers

Art Gallery Office
+1.213.765.4201

Audio/Visual Services
+1.213.743.7103

Business Center
+1.213.741.1151 ext.5520

Computer Animation Festival Office
+1.213.765.4202

Conference Management Office
+1.213.743.7111

Emerging Technologies Office
+1.213.765.4203

Exhibition Management Office
+1.213.743.7100

Housing Desk
+1.213.765.4205

International Resources Office
+1.213.765.4204

Media Headquarters
+1.213.743.7106

Message Center
+1.213.765.4200

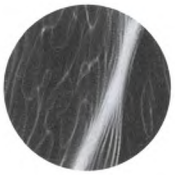
Los Angeles Convention Center Parking
+1.213.741.1151 ext. 5850

Security Office
+1.213.741.1151 ext. 4605

Shuttle Service
+1.213.308.9590

SIGGRAPH Store
+1.213.765.4210

Speaker Prep Room
+1. 213.765.4216



Location

South Hall H&J

Days & Hours

Tuesday, 10 August	10 am - 6 pm
Wednesday, 11 August	10 am - 6 pm
Thursday, 12 August	10 am - 5 pm

Exhibition

Welcome to the future of computer graphics and interactive techniques. This is the world's biggest, most significant exhibition of everything everybody needs in computer graphics and interactive techniques. All the products and services. All the publications and educational institutions. All the employers and producers.

Important Notice

Registered attendees under the age of 16 must be accompanied by an adult at all times throughout the Los Angeles Convention Center, except for the Exhibition, where children under 16 are not permitted. Age verification is required for the Exhibition.

Space Reservation

To purchase exhibition space for SIGGRAPH 2005, call or write:

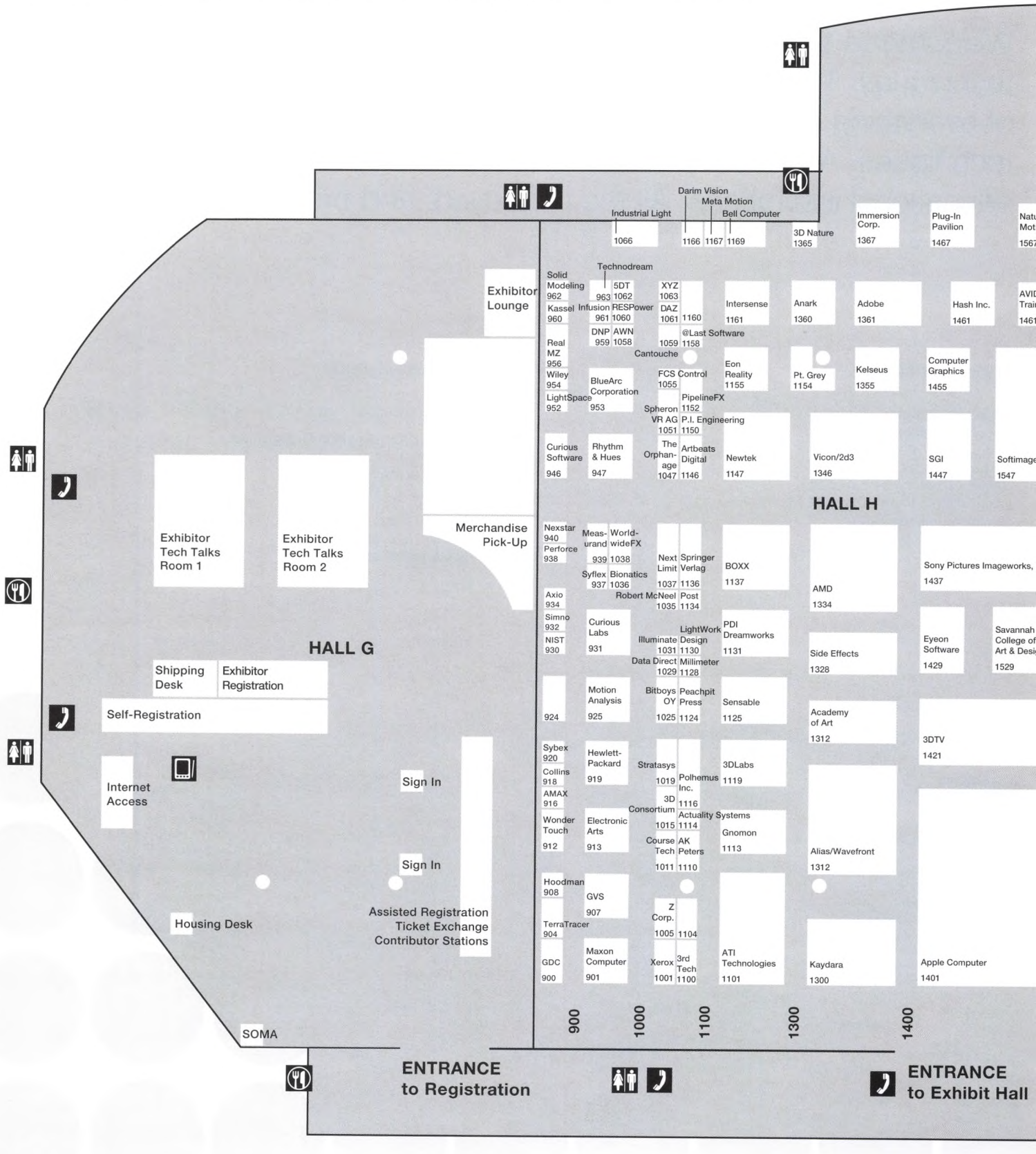
SIGGRAPH 2005 Exhibition Management
Hall-Erickson, Inc.
98 East Naperville Road
Westmont, Illinois 60559 USA

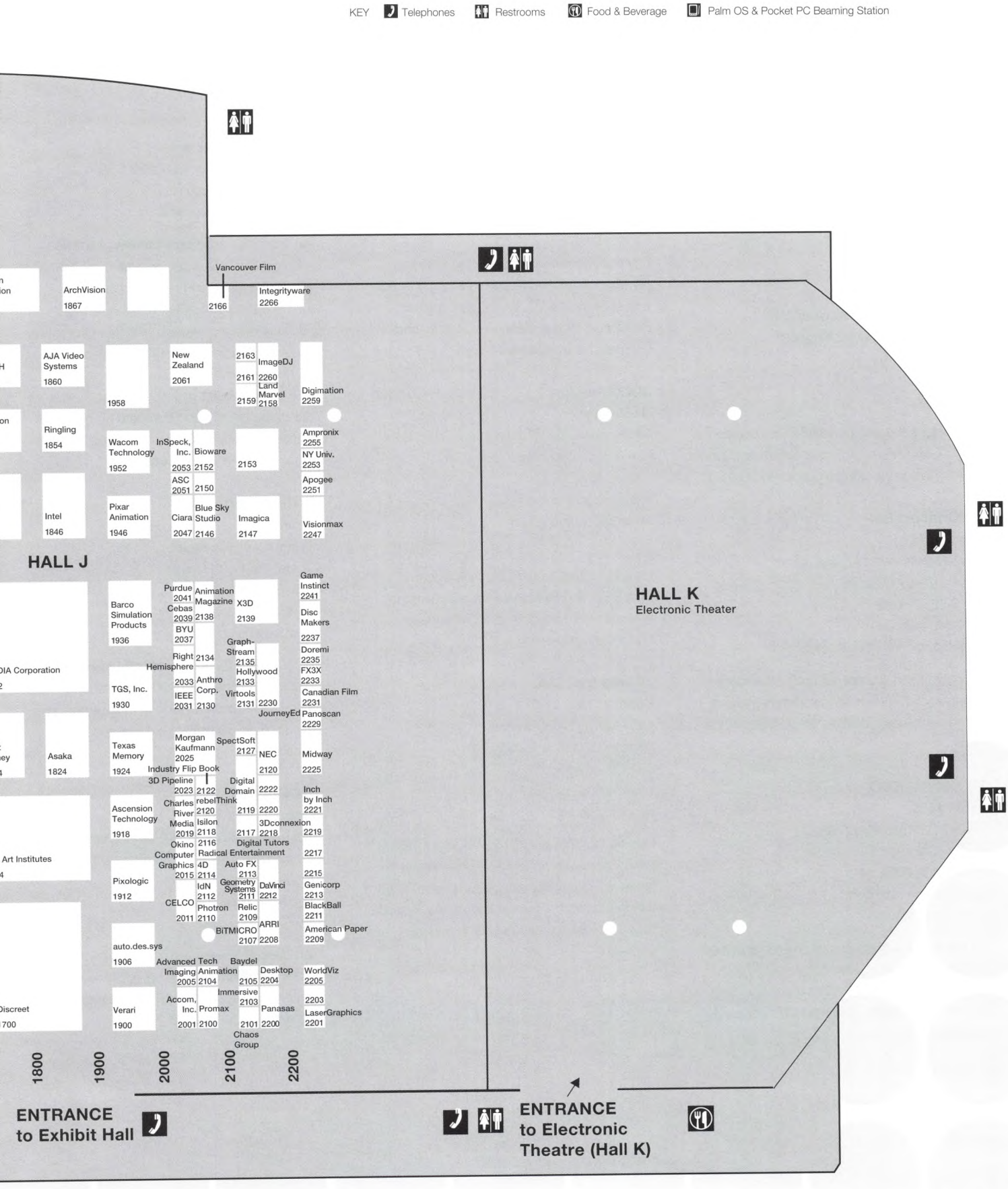
+1.630.434.7779
+1.630.434.1216 fax
halleric@siggraph.org

Products and Services on Display

2D Graphics
3D Graphics
3D Modeling
3D Rapid Protoyping
Aerospace and Automotive Applications
Animation
Architecture Applications
Artificial Intelligence
Authoring Software
Broadcast Design Software
Business and Financial Graphics
CAD/CAM/CAE/CIM
Commercial Game Engines/Equipment
Computer Video Interfacing
Conferences and Exhibition
Consulting
Contract Graphics/Programming
Data Analyhsis
Desktop Publishing
Desktop Video Production Software
Digital Cameras
Digital Imaging
Digital Video Hardware
Digitizing Cameras
DVD Authoring Tools
Education/Training
Electronic Publishing
Encoders/Decoders
Engineering Applications
Furniture
Geographic Information Systems
Graphic Design Systems
Graphcis Accelerator Boards
Graphics Standards Software
GroupWare
Haptic Input Devices
HDTV
Head-Mounted Displays
High Performance Graphics Processors
High-Resolution Technologies
Image-Based Modeling
Image Management
Industrial Design
Information Visualization
Input Devices
Interface Tools
Mapping and Cartography
Medical Imaging Software
Mobile Computing
Monitors and Displays
Motion Capture
Multimedia Tools and Applications
Networking
OEM Components
Paint Systems
Printers and Plotters
Projectors
Publications
RAID Systems and Storage
Rendering and Modeling
Robotics
Scan Converters
Scanners
Scientific Applications
Scientific Visualization
Simulation
Storage Devices; Tape/Disk
Streaming Technology
Systems Integrators
Terminals, Monitors, and Displays
Video Effects Equipment
Video Encoding and Compression
Video Servers
Visual Effects Software
VR Software
Web 3D
Web Graphics
Workstation

Exhibition Floor Plan

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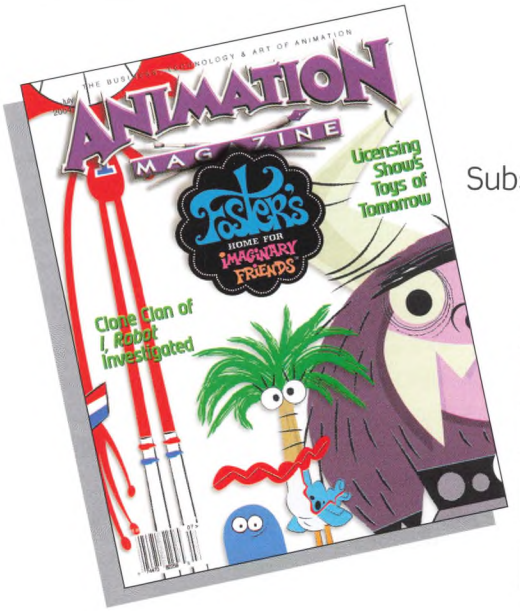

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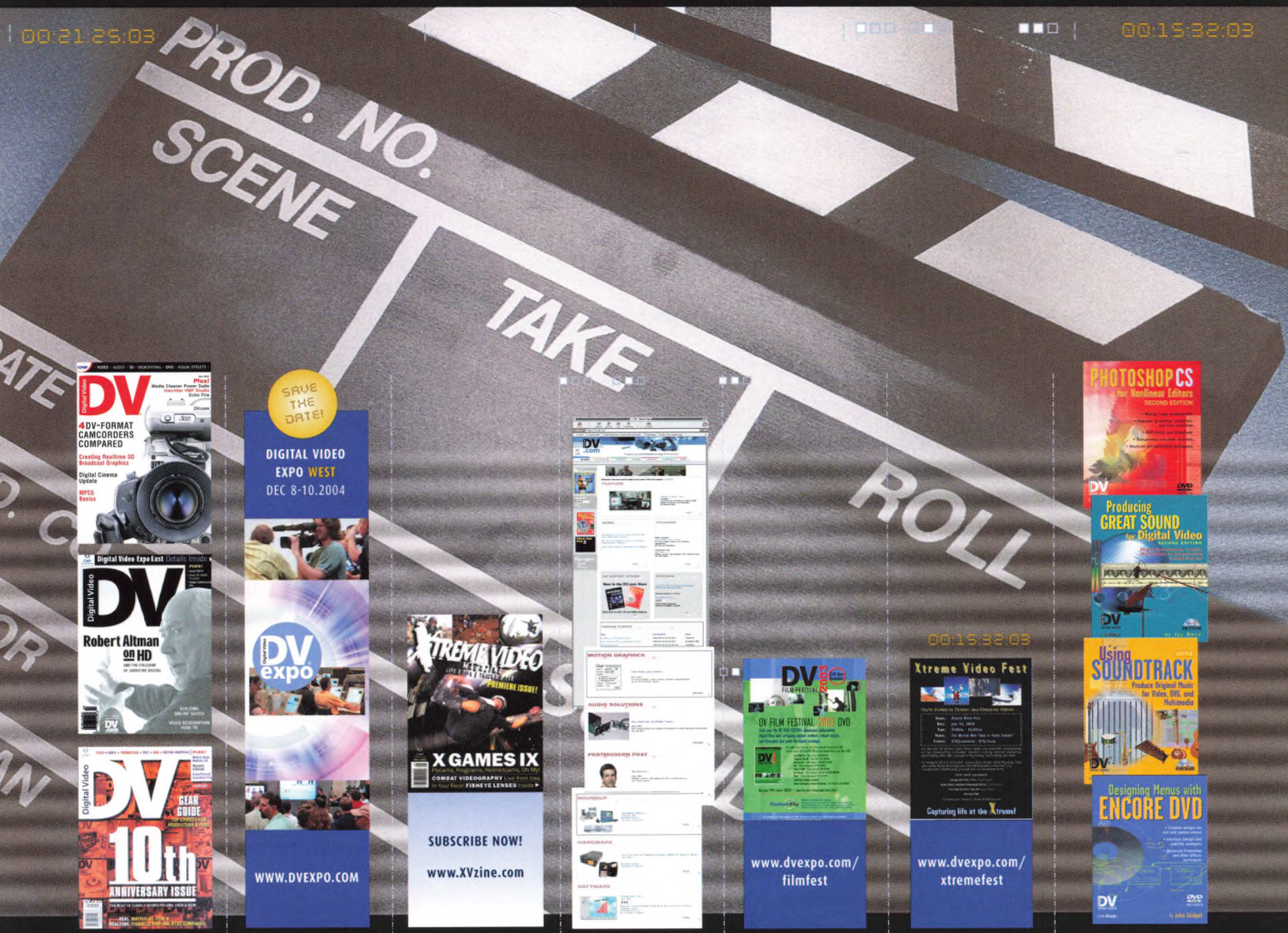

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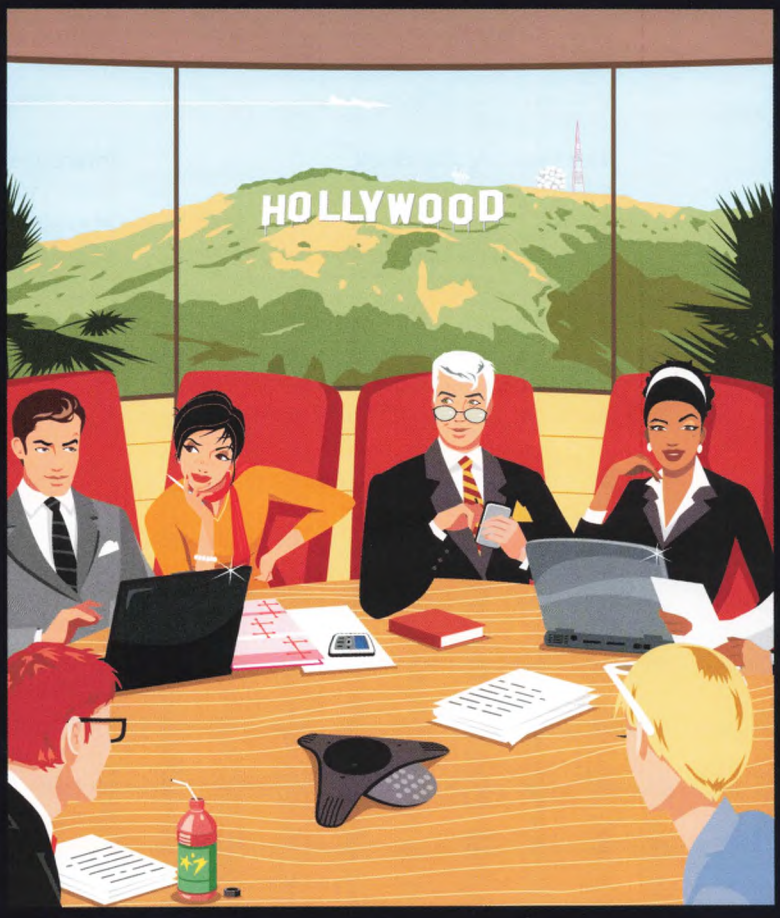

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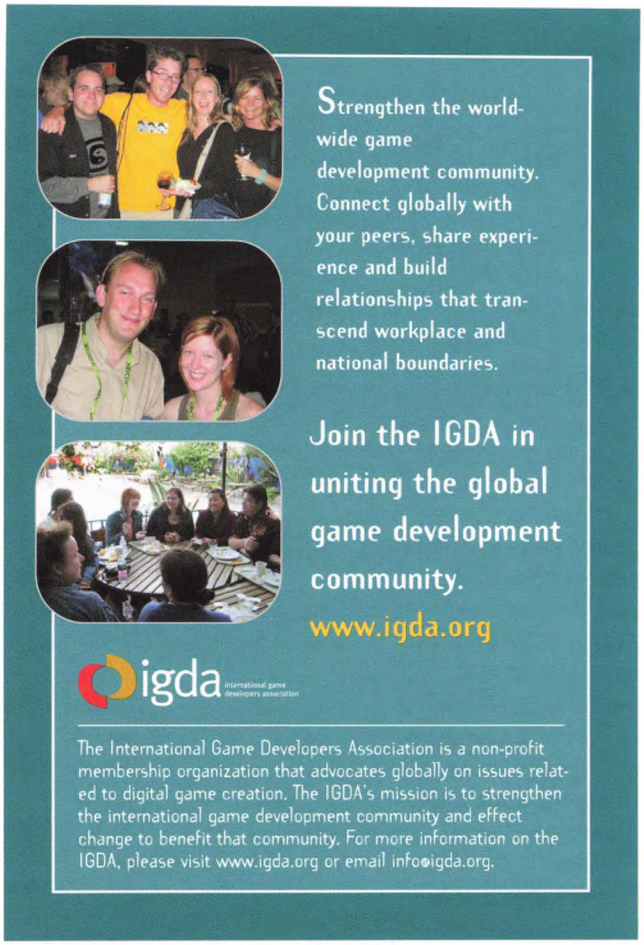

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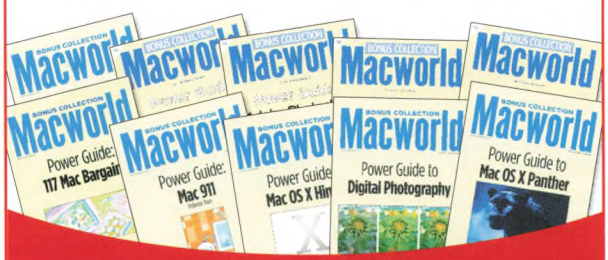

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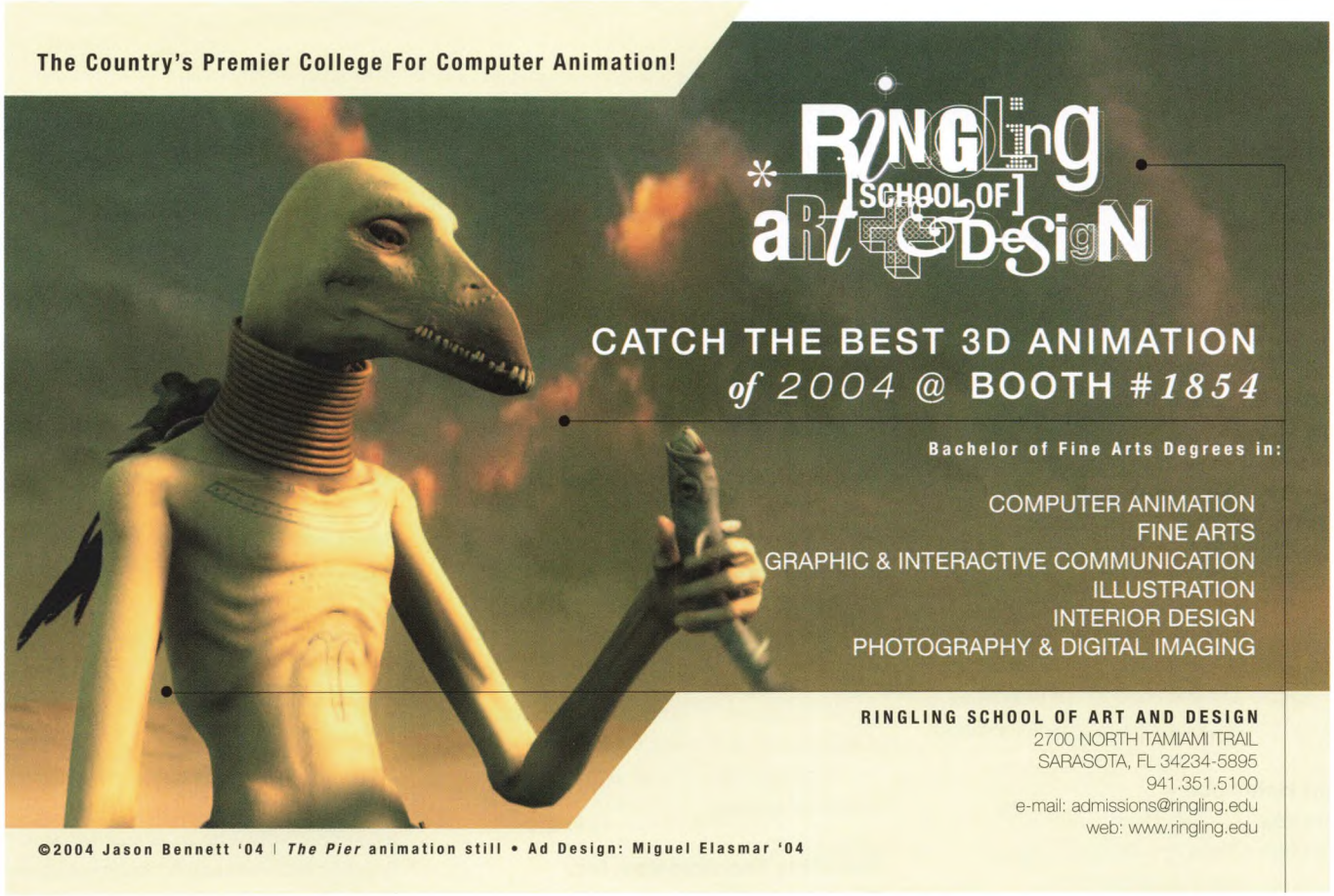

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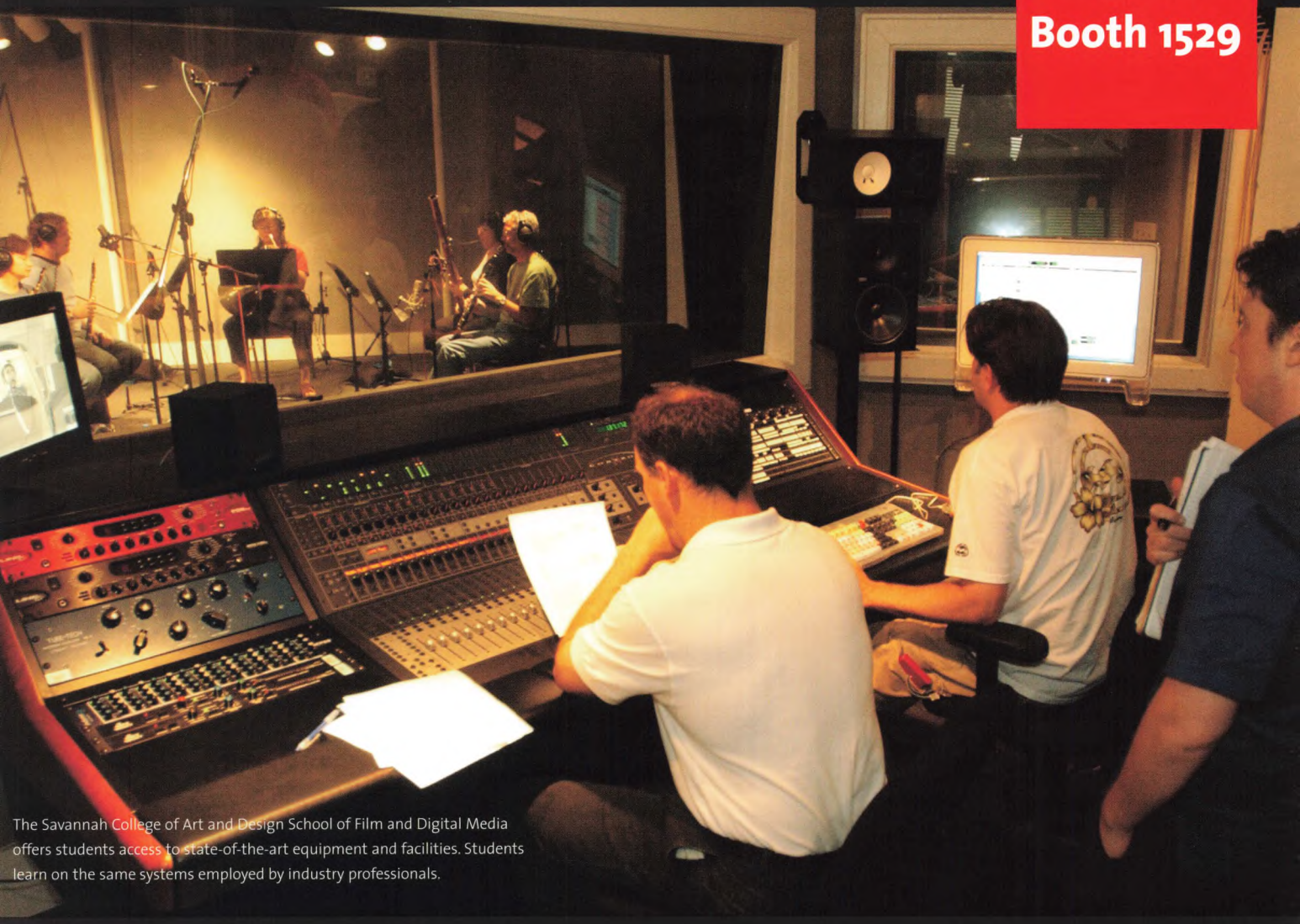

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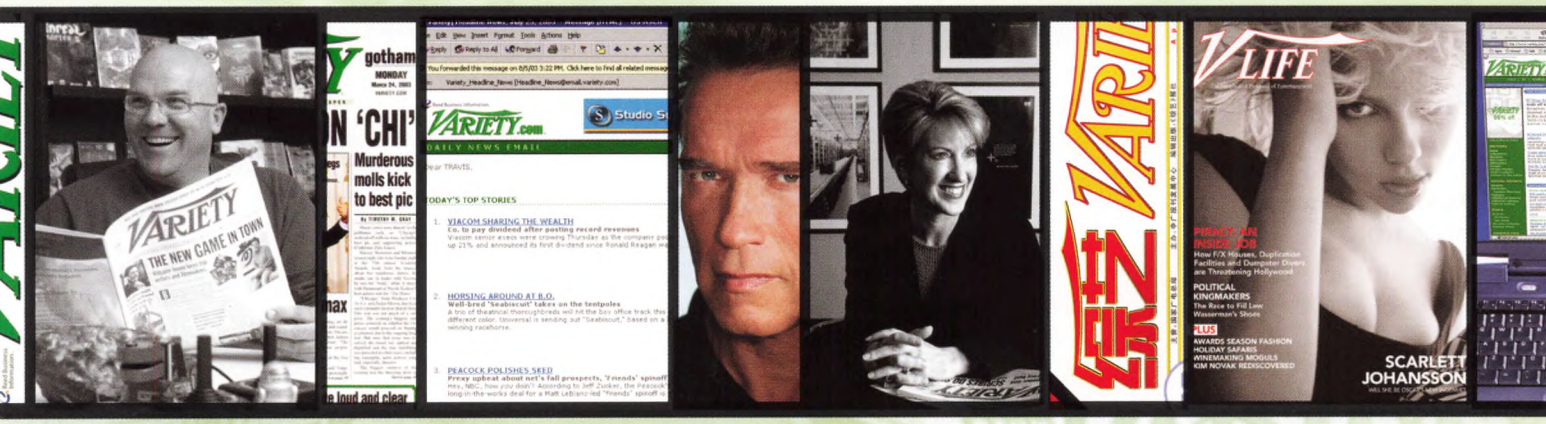

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2211 BlackBall, Inc.
900 Global Digital Creations Holdings Limited
2135 GraphStream Inc.
2033 Right Hemisphere
2127 SpectSoft, LLC

Booth

Industrial Design

2114 4DCULTURE
1312 Alias
1360 Anark Corporation
1906 auto.des.sys, Inc.
1455 Computer Graphics World
1429 eyeon Software Inc.
900 Global Digital Creations Holdings Limited
2135 GraphStream Inc.
919 Hewlett-Packard Company
1367 Immersion Corporation
2266 IntegrityWare, Inc.
2230 JourneyEd.com
1130 LightWork Design Ltd.
1930 Mercury Computer Systems, Inc.
2015 Okino Computer Graphics, Inc.
1124 Peachpit Press
2033 Right Hemisphere
2205 WorldViz LLC

Information Visualization

2023 3D Pipeline Simulation Corporation
1062 5DT (Fifth Dimension Technologies)
1114 Actuality Systems, Inc.
1360 Anark Corporation
1906 auto.des.sys, Inc.
1936 Barco
1429 eyeon Software Inc.
2135 GraphStream Inc.
1367 Immersion Corporation
1355 Kelseus Ltd.
1930 Mercury Computer Systems, Inc.
956 REALVIZ S.A.
2033 Right Hemisphere
1447 SGI
932 Systems in Motion AS
2205 WorldViz LLC

Input Devices

2218 3Dconnexion
1100 3rdTech, Inc.
1062 5DT (Fifth Dimension Technologies)
1918 Ascension Technology Corporation
1455 Computer Graphics World
1367 Immersion Corporation
1161 InterSense, Incorporated
939 Measurand Inc.
1167 Meta Motion
1150 P.I. Engineering, Inc.
1154 Point Grey Research Inc.
1116 Polhemus, Inc.
2127 SpectSoft, LLC
1952 Wacom Technology Co.
2205 WorldViz LLC

Interface Tools

1100 3rdTech, Inc.
1062 5DT (Fifth Dimension Technologies)
1114 Actuality Systems, Inc.
2209 American Paper Optics, Inc.
1367 Immersion Corporation

Booth

1161 InterSense, Incorporated
1150 P.I. Engineering, Inc.

Mapping and Cartography

1365 3D Nature, LLC
1119 3Dlabs Inc. Ltd.
1062 5DT (Fifth Dimension Technologies)
2209 American Paper Optics, Inc.
946 Curious Software Company Limited
1930 Mercury Computer Systems, Inc.

Medical Imaging Software

1119 3Dlabs Inc. Ltd.
2114 4DCULTURE
1062 5DT (Fifth Dimension Technologies)
1114 Actuality Systems, Inc.
1360 Anark Corporation
1455 Computer Graphics World
1429 eyeon Software Inc.
2135 GraphStream Inc.
901 MAXON Computer Inc.
1930 Mercury Computer Systems, Inc.
925 Motion Analysis Corporation
1116 Polhemus, Inc.
2033 Right Hemisphere
962 Solid Modeling Solutions
2205 WorldViz LLC

Mobile Computing

916 AMAX Information Technologies
1401 Apple Computer, Inc.
1101 ATI Technologies Inc.
1137 BOXX Technologies, Inc.
1455 Computer Graphics World
919 Hewlett-Packard Company
1161 InterSense, Incorporated
1732 NVIDIA Corporation

Monitors and Displays

1015 3D Consortium
1062 5DT (Fifth Dimension Technologies)
1114 Actuality Systems, Inc.
916 AMAX Information Technologies
1401 Apple Computer, Inc.
1936 Barco
1169 Bell Computer
1455 Computer Graphics World
919 Hewlett-Packard Company
908 Hoodman Corporation
2224 NEC-Mitsubishi Electronics Display of America Inc.
2100 ProMax Systems, Inc.
1447 SGI
960 University of Kassel
1952 Wacom Technology Co.

Motion Capture Equipment

1100 3rdTech, Inc.
1062 5DT (Fifth Dimension Technologies)
1361 Adobe Systems Incorporated

Booth

916 AMAX Information Technologies
1918 Ascension Technology Corporation
1455 Computer Graphics World
919 Hewlett-Packard Company
1367 Immersion Corporation
1161 InterSense, Incorporated
2230 JourneyEd.com
939 Measurand Inc.
1167 Meta Motion
925 Motion Analysis Corporation
1154 Point Grey Research Inc.
1116 Polhemus, Inc.
1346 Vicon Motion Systems Ltd.
2205 WorldViz LLC

Motion Capture Software

1100 3rdTech, Inc.
1062 5DT (Fifth Dimension Technologies)
1401 Apple Computer, Inc.
1455 Computer Graphics World
913 Electronic Arts Inc.
919 Hewlett-Packard Company
2230 JourneyEd.com
1300 Kaydara, Inc.
939 Measurand Inc.
1167 Meta Motion
925 Motion Analysis Corporation
1567 NaturalMotion Ltd
1124 Peachpit Press
1154 Point Grey Research Inc.
1547 Softimage Co.
937 Syflex LLC
1346 Vicon Motion Systems Ltd.
2205 WorldViz LLC

Multimedia Tools and Applications

1365 3D Nature, LLC
2114 4DCULTURE
1062 5DT (Fifth Dimension Technologies)
1361 Adobe Systems Incorporated
1360 Anark Corporation
1401 Apple Computer, Inc.
1101 ATI Technologies Inc.
2113 Auto FX Software
2211 BlackBall, Inc.
2019 Charles River Media
1455 Computer Graphics World
946 Curious Software Company Limited
2204 Desktop Images
1700 Discreet
1760 DVS GmbH
1429 eyeon Software Inc.
2135 GraphStream Inc.
1461 Hash, Inc.
1367 Immersion Corporation
2266 IntegrityWare, Inc.
1161 InterSense, Incorporated
2230 JourneyEd.com
1300 Kaydara, Inc.
1059 La Cantoche production

Booth

1167 Meta Motion
925 Motion Analysis Corporation
2015 Okino Computer Graphics, Inc.
2041 Purdue University Department of Computer Graphics Technology
956 REALVIZ S.A.
2033 Right Hemisphere
1547 Softimage Co.
2127 SpectSoft, LLC
920 Sybex, Inc.
932 Systems in Motion AS
2104 Technical Animations, Inc.
2131 Virtools SA
2205 WorldViz LLC

Multimedia Tools and Applications-HW

2001 Accom, Inc.
1114 Actuality Systems, Inc.
2209 American Paper Optics, Inc.
1401 Apple Computer, Inc.
1936 Barco
1760 DVS GmbH
900 Global Digital Creations Holdings Limited
1367 Immersion Corporation
1732 NVIDIA Corporation
1447 SGI
2127 SpectSoft, LLC
2205 WorldViz LLC

Networking Equipment

916 AMAX Information Technologies
1401 Apple Computer, Inc.
1169 Bell Computer
953 BlueArc Corporation
1029 DataDirect Networks Inc.
2135 GraphStream Inc.
919 Hewlett-Packard Company
2127 SpectSoft, LLC
1900 Verari Systems, Inc.

Networking Infrastructure

2211 BlackBall, Inc.
953 BlueArc Corporation
2135 GraphStream Inc.
919 Hewlett-Packard Company
2200 Panasas Inc.
2033 Right Hemisphere
920 Sybex, Inc.
1924 Texas Memory Systems

OEM Components

1119 3Dlabs Inc. Ltd.
1860 AJA Video Systems Inc.
916 AMAX Information Technologies
1334 AMD
1918 Ascension Technology Corporation
1101 ATI Technologies Inc.
1137 BOXX Technologies, Inc.
1760 DVS GmbH
900 Global Digital Creations Holdings Limited

Booth

1161 InterSense, Incorporated
925 Motion Analysis Corporation
1116 Polhemus, Inc.
2205 WorldViz LLC

Paint Systems

1361 Adobe Systems Incorporated
946 Curious Software Company Limited
1700 Discreet
1429 eyeon Software Inc.
901 MAXON Computer Inc.
1147 NewTek, Inc.
1912 Pixologic, Inc.
2033 Right Hemisphere
1547 Softimage Co.

Printers and Plotters

2011 CELCO, Inc.
1455 Computer Graphics World
919 Hewlett-Packard Company
1001 Xerox Corporation

Projectors

1015 3D Consortium
1062 5DT (Fifth Dimension Technologies)
2208 ARRI Group
1936 Barco
1455 Computer Graphics World

Publications

1110 A K Peters, Ltd.
2005 Advanced Imaging Magazine
2138 Animation Magazine Inc.
2051 ASC-American Cinematographer
2019 Charles River Media
1455 Computer Graphics World
1011 Course PTR
2025 Focal Press
2133 Hollywood Creative Directory, Inc.
2112 IdN Magazine
2031 IEEE Computer Society
1128 millimeter
2025 Morgan Kaufmann Publishers
1124 Peachpit Press
1134 Post Magazine (Advanstar Communications)
1128 Primedia Business Magazines & Media
2041 Purdue University Department of Computer Graphics Technology
1136 Springer-Verlag NY, LLC
920 Sybex, Inc.
960 University of Kassel
1128 Video Systems
1724 Walt Disney Feature Animation

RAID Systems and Storage

916 AMAX Information Technologies
1401 Apple Computer, Inc.
1824 Asaca/Shibasoku Corporation of America
1169 Bell Computer

Booth

2047 Ciara Technologies
1455 Computer Graphics World
1029 DataDirect Networks Inc.
2212 da Vinci Systems, Inc.
919 Hewlett-Packard Company
2200 Panasas Inc.
1447 SGI
2127 SpectSoft, LLC
1924 Texas Memory Systems
1900 Verari Systems, Inc.

Rendering and Modeling

1365 3D Nature, LLC
2023 3D Pipeline Simulation Corporation
1119 3Dlabs Inc. Ltd.
1114 Actuality Systems, Inc.
1361 Adobe Systems Incorporated
1312 Alias
916 AMAX Information Technologies
1401 Apple Computer, Inc.
1867 ArchVision, Inc.
1906 auto.des.sys, Inc.
1036 Bionatics
2039 cebas Computer GmbH
2101 Chaos Group
2047 Ciara Technologies
1455 Computer Graphics World
1700 Discreet
913 Electronic Arts Inc.
1429 eyeon Software Inc.
900 Global Digital Creations Holdings Limited
2135 GraphStream Inc.
919 Hewlett-Packard Company
1031 Illuminate Labs
1367 Immersion Corporation
2053 InSpeck Inc.
2266 IntegrityWare, Inc.
2230 JourneyEd.com
1130 LightWork Design Ltd.
901 MAXON Computer Inc.
1930 Mercury Computer Systems, Inc.
1147 NewTek, Inc.
1037 Next Limit S.L.
1732 NVIDIA Corporation
2015 Okino Computer Graphics, Inc.
2200 Panasas Inc.
1124 Peachpit Press
1152 Pipelinefx, LLC
2041 Purdue University Department of Computer Graphics Technology
956 REALVIZ S.A.
2120 rebelThink digital effects
2033 Right Hemisphere
1125 SensAble Technologies, Inc.
1447 SGI
1328 Side Effects Software
1547 Softimage Co.
962 Solid Modeling Solutions
1051 SpheronVR AG
920 Sybex, Inc.
932 Systems in Motion AS

Booth

2104 Technical Animations, Inc.
2205 WorldViz LLC

Robotics

1110 A K Peters, Ltd.
1055 FCS Control Systems B.V.
1161 InterSense, Incorporated
939 Measurand Inc.
1167 Meta Motion

Scan Converters

1455 Computer Graphics World

Scanners

1100 3rdTech, Inc.
2114 4DCULTURE
2011 CELCO, Inc.
1455 Computer Graphics World
919 Hewlett-Packard Company
2147 IMAGICA Corp.
1367 Immersion Corporation
2053 InSpeck Inc.
2230 JourneyEd.com
1116 Polhemus, Inc.
963 TechnoDream21
1063 XYZ RGB INC.

Scientific Application

1365 3D Nature, LLC
2114 4DCULTURE
2209 American Paper Optics, Inc.
1036 Bionatics
2047 Ciara Technologies
1455 Computer Graphics World
1367 Immersion Corporation
2266 IntegrityWare, Inc.
2230 JourneyEd.com
939 Measurand Inc.
1930 Mercury Computer Systems, Inc.
1167 Meta Motion
1958 Micoy
1037 Next Limit S.L.
2200 Panasas Inc.
1124 Peachpit Press
2041 Purdue University Department of Computer Graphics Technology
2033 Right Hemisphere
1125 SensAble Technologies, Inc.
937 Syflex LLC
1930 TGS, Inc.
2205 WorldViz LLC

Scientific Visualization

1365 3D Nature, LLC
1119 3Dlabs Inc. Ltd.
1062 5DT (Fifth Dimension Technologies)
1114 Actuality Systems, Inc.
1312 Alias
1360 Anark Corporation
1906 auto.des.sys, Inc.
1036 Bionatics

Booth

2047 Ciara Technologies
1455 Computer Graphics World
1700 Discreet
1429 eyeon Software Inc.
2135 GraphStream Inc.
1367 Immersion Corporation
2266 IntegrityWare, Inc.
901 MAXON Computer Inc.
939 Measurand Inc.
1930 Mercury Computer Systems, Inc.
1167 Meta Motion
1037 Next Limit S.L.
2200 Panasas Inc.
1124 Peachpit Press
2041 Purdue University Department of Computer Graphics Technology
2033 Right Hemisphere
1125 SensAble Technologies, Inc.
1447 SGI
932 Systems in Motion AS
2205 WorldViz LLC

Simulation

2023 3D Pipeline Simulation Corporation
1119 3Dlabs Inc. Ltd.
1062 5DT (Fifth Dimension Technologies)
1360 Anark Corporation
1936 Barco
1036 Bionatics
2047 Ciara Technologies
1455 Computer Graphics World
1429 eyeon Software Inc.
900 Global Digital Creations Holdings Limited
2135 GraphStream Inc.
2266 IntegrityWare, Inc.
2230 JourneyEd.com
1300 Kaydara, Inc.
1130 LightWork Design Ltd.
1930 Mercury Computer Systems, Inc.
1167 Meta Motion
1037 Next Limit S.L.
2200 Panasas Inc.
2041 Purdue University Department of Computer Graphics Technology
956 REALVIZ S.A.
2033 Right Hemisphere
1125 SensAble Technologies, Inc.
1447 SGI
1547 Softimage Co.
937 Syflex LLC
2205 WorldViz LLC

Storage Devices; Tape/Disk

916 AMAX Information Technologies
1824 Asaca/Shibasoku Corporation of America
953 BlueArc Corporation
2047 Ciara Technologies
1455 Computer Graphics World
1029 DataDirect Networks Inc.
2212 da Vinci Systems, Inc.

Booth

1760 DVS GmbH
2135 GraphStream Inc.
919 Hewlett-Packard Company
2230 JourneyEd.com
2200 Panasas Inc.
1924 Texas Memory Systems
1900 Verari Systems, Inc.

Streaming Technology

1361 Adobe Systems Incorporated
1401 Apple Computer, Inc.
2047 Ciara Technologies
2135 GraphStream Inc.
2230 JourneyEd.com
1147 NewTek, Inc.
2200 Panasas Inc.
1154 Point Grey Research Inc.
1447 SGI
920 Sybex, Inc.
1924 Texas Memory Systems

Systems Integrators

1062 5DT (Fifth Dimension Technologies)
916 AMAX Information Technologies
1936 Barco
2266 IntegrityWare, Inc.
2127 SpectSoft, LLC
2205 WorldViz LLC

Terminals, Monitors and Displays

1015 3D Consortium
1062 5DT (Fifth Dimension Technologies)
1114 Actuality Systems, Inc.
916 AMAX Information Technologies
1401 Apple Computer, Inc.
1936 Barco
1455 Computer Graphics World
919 Hewlett-Packard Company
1447 SGI
960 University of Kassel
1952 Wacom Technology Co.

Video Effects Equipment

2001 Accom, Inc.
916 AMAX Information Technologies
1137 BOXX Technologies, Inc.
2011 CELCO, Inc.
1455 Computer Graphics World
1760 DVS GmbH
1429 eyeon Software Inc.
1161 InterSense, Incorporated
1147 NewTek, Inc.
1732 NVIDIA Corporation
1547 Softimage Co.
2127 SpectSoft, LLC

Video Encoding and Compression

2001 Accom, Inc.
1401 Apple Computer, Inc.
1101 ATI Technologies Inc.
2047 Ciara Technologies

Booth

2230 JourneyEd.com
1447 SGI

Video Servers

2001 Accom, Inc.
916 AMAX Information Technologies
1401 Apple Computer, Inc.
1137 BOXX Technologies, Inc.
2047 Ciara Technologies
2212 da Vinci Systems, Inc.
1760 DVS GmbH
2135 GraphStream Inc.
1447 SGI
2127 SpectSoft, LLC
1924 Texas Memory Systems

Visual Effects Software

2023 3D Pipeline Simulation Corporation
1114 Actuality Systems, Inc.
1361 Adobe Systems Incorporated
1312 Alias
1360 Anark Corporation
1401 Apple Computer, Inc.
1146 Artbeats, Inc.
2113 Auto FX Software
2105 Baydel (DataFrameworks)
1036 Bionatics
2011 CELCO, Inc.
1455 Computer Graphics World
946 Curious Software Company Limited
2119 Digital Domain, Inc.
1700 Discreet
1429 eyeon Software Inc.
1461 Hash, Inc.
919 Hewlett-Packard Company
2147 IMAGICA Corp.
2266 IntegrityWare, Inc.
2230 JourneyEd.com
1300 Kaydara, Inc.
1130 LightWork Design Ltd.
901 MAXON Computer Inc.
1930 Mercury Computer Systems, Inc.
1167 Meta Motion
1147 NewTek, Inc.
1037 Next Limit S.L.
1732 NVIDIA Corporation
1124 Peachpit Press
2110 Photron USA, Inc.
2041 Purdue University Department of Computer Graphics Technology
956 REALVIZ S.A.
2120 rebelThink digital effects
2033 Right Hemisphere
1447 SGI
1328 Side Effects Software
1547 Softimage Co.
1437 Sony Pictures Imageworks Inc.
2127 SpectSoft, LLC
920 Sybex, Inc.
937 Syflex LLC
960 University of Kassel

Booth

912 wondertouch, LLC

VR Software

1015 3D Consortium
2023 3D Pipeline Simulation Corporation
1062 5DT (Fifth Dimension Technologies)
1114 Actuality Systems, Inc.
1936 Barco
1036 Bionatics
2135 GraphStream Inc.
1367 Immersion Corporation
2266 IntegrityWare, Inc.
1300 Kaydara, Inc.
1930 Mercury Computer Systems, Inc.
1167 Meta Motion
925 Motion Analysis Corporation
1124 Peachpit Press
2041 Purdue University Department of Computer Graphics Technology
956 REALVIZ S.A.
2033 Right Hemisphere
1125 SensAble Technologies, Inc.
1447 SGI
1547 Softimage Co.
932 Systems in Motion AS
2131 Virtools SA
2205 WorldViz LLC

Web 3D

1015 3D Consortium
1119 3Dlabs Inc. Ltd.
2114 4DCULTURE
1312 Alias
2209 American Paper Optics, Inc.
1360 Anark Corporation
1101 ATI Technologies Inc.
2039 cebas Computer GmbH
1455 Computer Graphics World
2259 Digimation, Inc.
1700 Discreet
913 Electronic Arts Inc.
2111 Geometry Systems Inc.
1461 Hash, Inc.
1367 Immersion Corporation
2053 InSpeck Inc.
2266 IntegrityWare, Inc.
2230 JourneyEd.com
1059 La Cantoche production
901 MAXON Computer Inc.
2061 Media Design School
1930 Mercury Computer Systems, Inc.
1167 Meta Motion
925 Motion Analysis Corporation
2015 Okino Computer Graphics, Inc.
1124 Peachpit Press
956 REALVIZ S.A.
2033 Right Hemisphere
1547 Softimage Co.
962 Solid Modeling Solutions
920 Sybex, Inc.

Booth

1930 TGS, Inc.
2131 Virtools SA

Web Graphics

1365 3D Nature, LLC
1119 3Dlabs Inc. Ltd.
1361 Adobe Systems Incorporated
1312 Alias
1401 Apple Computer, Inc.
1101 ATI Technologies Inc.
2113 Auto FX Software
1455 Computer Graphics World
946 Curious Software Company Limited
2204 Desktop Images
913 Electronic Arts Inc.
1429 eyeon Software Inc.
2266 IntegrityWare, Inc.
1766 Italian Institute for Foreign Trade
2230 JourneyEd.com
2061 Media Design School
1930 Mercury Computer Systems, Inc.
1167 Meta Motion
2015 Okino Computer Graphics, Inc.
1124 Peachpit Press
2041 Purdue University Department of Computer Graphics Technology
956 REALVIZ S.A.
2033 Right Hemisphere
1547 Softimage Co.
920 Sybex, Inc.
1724 Walt Disney Feature Animation

Workstations

1119 3Dlabs Inc. Ltd.
916 AMAX Information Technologies
1334 AMD
2130 Anthro Corporation
1401 Apple Computer, Inc.
1101 ATI Technologies Inc.
1169 Bell Computer
1137 BOXX Technologies, Inc.
2047 Ciara Technologies
1455 Computer Graphics World
1760 DVS GmbH
2135 GraphStream Inc.
919 Hewlett-Packard Company
1732 NVIDIA Corporation
2100 ProMax Systems, Inc.
1447 SGI
1900 Verari Systems, Inc.

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Capstone Solutions, Inc.

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AVW-TELAV Audio Visual Solutions

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New York University

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Marketing and Media
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ACM SIGGRAPH

ACM SIGGRAPH Organization

ACM SIGGRAPH
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Chapters of ACM SIGGRAPH exist in 70 cities in 20 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 supports both computer graphics education and the use of computer graphics in education with curriculum studies, a web site for educators, and other educational projects. The ACM SIGGRAPH Education booth features SPACE (a juried exhibition of student animations and posters, and a display of student slides submitted by faculty from around the world) and SPICE, a juried exhibition of student web-based projects. For more information, see: **www.siggraph.org/education**

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ACM SIGGRAPH helps organize and sponsor focused conferences, workshops, and other symposia around the world on topics related to computer graphics and interactive techniques. These gatherings enable groups with specific interests to get together and exchange information. To see the list of symposia or find out how to get help for a conference you'd like to organize, stop by the ACM SIGGRAPH booth or visit: **www.siggraph.org/conferences**

Awards
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**

Publications
ACM SIGGRAPH publications provide the world's leading forums for computer graphics research. Our conference series provides the largest source of citations in the computer graphics literature. The Computer Graphics quarterly provides articles on current topics in computer graphics and personal viewpoints on the evolving fields that make up our community. Publications are available to ACM SIGGRAPH members for substantial discounts. See: **www.siggraph.org/publications**

SIGGRAPH Video Review
SIGGRAPH Video Review is the world's most widely circulated video-based publication. Nearly 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 2004 Store in the South Lobby. For information, contact: **svrorders@siggraph.org**

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Cooperative Agreements

ANZGRAPH
ANZGRAPH, the Australian and New Zealand Association for Computer Graphics, aims to provide a forum for individuals, organizations and companies that have some direct interest in the area of computer graphics. The goal is to foster the development of a computer graphics community in the Australasian region, provide a pathway to the community within our region, and facilitate participation as a member of ANZGRAPH both regionally and internationally.
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
www.saga.za.org/

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 23nd International Digital Entertainment & Interactive Content Trade Show, will be held at the Grimaldi Forum in Monte Carlo, 2-5 February 2005. 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

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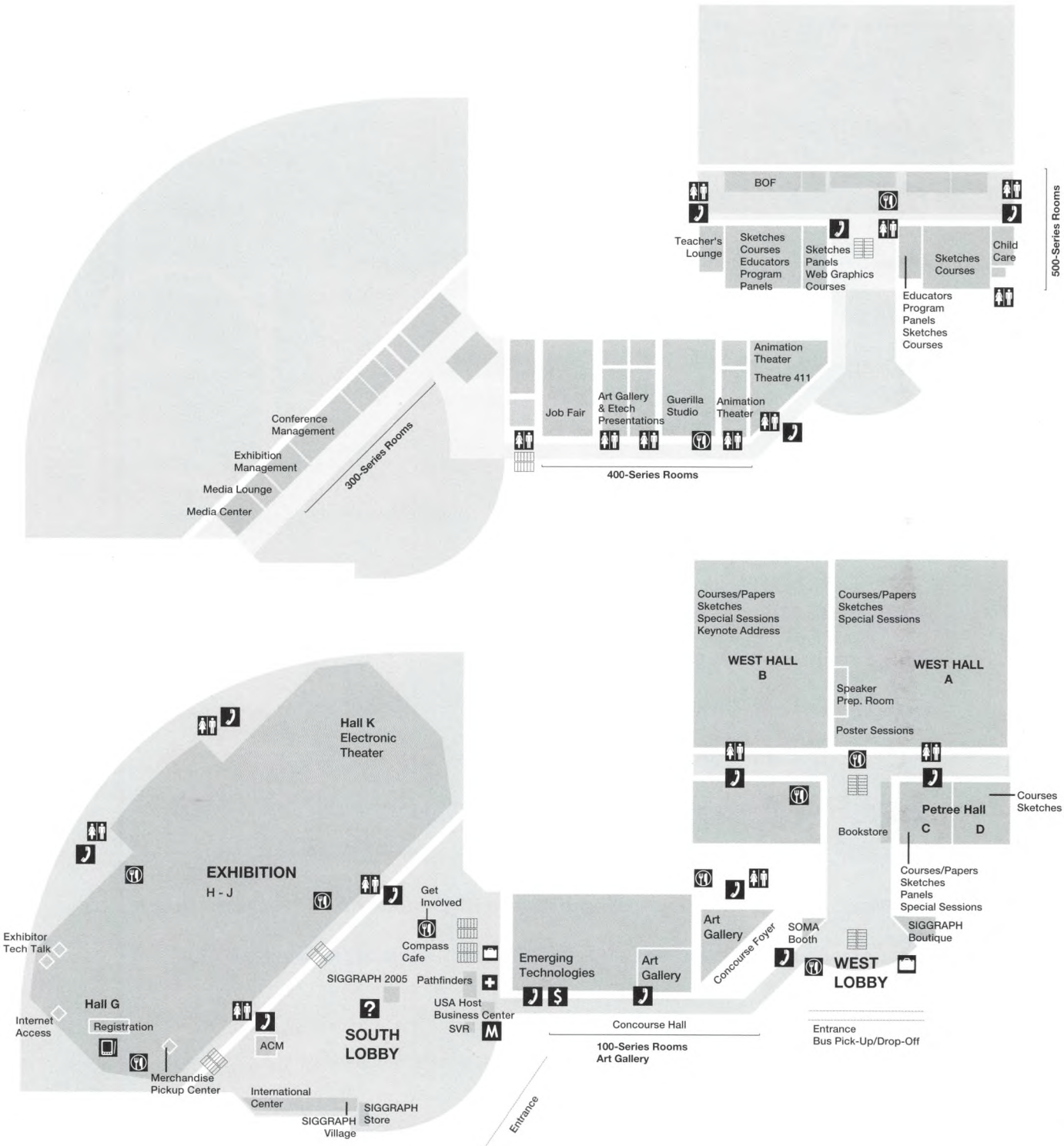

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ACM Student Research Competition

Wednesday, 11 August

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 present talks on Wednesday, 11 August, 3:45 - 5:30 pm.

For more detailed information: www.siggraph.org/s2004/conference/posters

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 2004:

GP^2: Workshop on General Purpose Computing on Graphics Processors
7 - 8 August 2004
Wilshire Grand Hotel
Los Angeles, California

Talks, panels, and poster presentations by leading researchers and practitioners from academia, research labs, and industry on several issues, including:

- Could GPUs become useful co-processors for a wide variety of applications?
- What are their algorithmic and architectural niches and can they be broadened?
- Programmability, language and compiler support, and software environments.
- Future technology trends that might lead to more widespread use of GPUs

First Symposium on Applied Perception in Graphics and Visualization
7 - 8 August 2004
Wilshire Grand Hotel
Los Angeles, California

A forum for wider exchange of ideas and information between members of the graphics and visualization communities who are developing more effective visual, auditory, and/or haptic representation, and members of the vision-sciences community who are using computer graphics to investigate fundamental perception processes.

Inquiries about co-locating events with the annual SIGGRAPH conference should be directed to:

Barbara Helfer
ACM SIGGRAPH Vice President
colocate@siggraph.org

Adaptive Displays Conference
7 August 2004
Westin Bonaventure
Los Angeles, California

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