ADVANCE PROGRAM

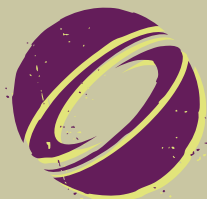## Table of Contents *(click to jump to section)*

THE 36TH INTERNATIONAL CONFERENCE AND EXHIBITION ON COMPUTER GRAPHICS AND INTERACTIVE TECHNIQUES

SIGGRAPH2009 NEW ORLEANS

www.siggraph.org/s2009

Conference 3 – 7 August 2009 Exhibition 4 – 6 August 2009
Ernest N. Morial Convention Center, New Orleans, Louisiana

Sponsored by ACMSIGGRAPH

SIGGRAPH2009

Conference Registration Categories

■ Full Conference Access   ● Basic Access   ▲ Computer Animation Festival

	Event	SUN 2 AUG	MON 3 AUG	TUE 4 AUG	WED 5 AUG	THU 6 AUG	FRI 7 AUG
	Registration/ Merchandise Pickup	2 - 6 pm	7:30 am - 6 pm	8 am - 6 pm	8 am - 6 pm	8 am - 6 pm	8 am - 3:30 pm
■ ● ▲	Exhibition			9:30 am - 6 pm	9:30 am - 6 pm	9:30 am - 3:30 pm	
■ ● ▲	Job Fair			10 am - 4 pm	10 am - 4 pm	10 am - 1 pm	
■ ●	International Resources	2 - 6 pm	7:30 am - 6 pm	8 am - 6 pm	8 am - 6 pm	8 am - 6 pm	
■	Reception					8 - 10 pm	
■ ● ▲	Birds of a Feather	Throughout the week					

Sessions

	Event	SUN 2 AUG	MON 3 AUG	TUE 4 AUG	WED 5 AUG	THU 6 AUG	FRI 7 AUG
■ ●	ACM SIGGRAPH Award Talks		1:45 - 3:30 pm				
■	Art Papers			3:45 - 5:30 pm	1:45 - 3:30 pm		
■	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	8:30 am - 5:30 pm
■ ● ▲	Exhibitor Tech Talks			9:30 am - 6 pm	9:30 am - 6 pm	9:30 am - 3:30 pm	
■	Game Papers			8:30 - 10:15 am and 3:45 - 5:30 pm	8:30 - 10:15 am	1:45 - 5:30 pm	
■ ● ▲	Keynote Speakers		Randy Thom (ACM SIGGRAPH Award Presentations) 10:30 am - 12:15 pm	Will Wright 10:30 am - 12:15 pm	Steve Duenes 10:30 am - 12:15 pm		
■	Panels		3:45 - 5:30 pm	10:30 am - 12:15 pm	8:30 am - 5:30 pm	8:30 am - 5:30 pm	
■ ●	Poster Sessions			12:15 - 1:15 pm		12:15 - 1:15 pm	
■	Talks			8:30 - 10:15 am and 6:15 - 8 pm	8:30 - 10:15 am and 1:45 - 5:30 pm	10:30 am - 12:15 pm and 3:45 - 5:30 pm	8:30 am - 5:30 pm
■	Technical 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

Galleries & Experiences

	Event	SUN 2 AUG	MON 3 AUG	TUE 4 AUG	WED 5 AUG	THU 6 AUG	FRI 7 AUG
■ ●	BioLogic Art	9 am - 6 pm	9 am - 6 pm	9 am - 6 pm	9 am - 6 pm	9 am - 6 pm	9 am - noon
■ ●	Emerging Technologies	9 am - 6 pm	9 am - 6 pm	9 am - 6 pm	9 am - 6 pm	9 am - 6 pm	9 am - noon
■	Geek Bar	9 am - 6 pm	9 am - 6 pm	9 am - 6 pm	9 am - 6 pm	9 am - 6 pm	9 am - noon
■ ●	Generative Fabrication	9 am - 6 pm	9 am - 6 pm	9 am - 6 pm	9 am - 6 pm	9 am - 6 pm	9 am - noon
■ ●	Information Aesthetics Showcase	9 am - 6 pm	9 am - 6 pm	9 am - 6 pm	9 am - 6 pm	9 am - 6 pm	9 am - noon
■ ●	Posters	9 am - 6 pm	9 am - 6 pm	9 am - 6 pm	9 am - 6 pm	9 am - 6 pm	9 am - noon
■ ●	The Sandbox	9 am - 6 pm	9 am - 6 pm	9 am - 6 pm	9 am - 6 pm	9 am - 6 pm	9 am - noon
■ ●	The Studio	9 am - 6 pm	9 am - 6 pm	9 am - 6 pm	9 am - 6 pm	9 am - 6 pm	9 am - noon

Contests & Competitions

	Event	SUN 2 AUG	MON 3 AUG	TUE 4 AUG	WED 5 AUG	THU 6 AUG	FRI 7 AUG
■ ● ▲	ACM Student Research Competition					10:30 am - 12:15 pm (Final Presentation)	
■ ● ▲	FJORG!		9 am - Midnight	Midnight - 5 pm		6 - 8 pm (Judging Ceremony)	
■ ● ▲	GameJam!			6 pm - Midnight	Midnight - 6 pm	6 - 8 pm (Judging Ceremony)	
■ ●	Research Challenge			1:45 - 3:30 pm (Judging Ceremony)			
■ ●	Speedlab	4 - 5 pm					1:45 - 5:30 pm (Judging Ceremony)

Performances & Special Events

	Event	SUN 2 AUG	MON 3 AUG	TUE 4 AUG	WED 5 AUG	THU 6 AUG	FRI 7 AUG
■ ● ▲	Music and Audio		6 - 8 pm	8:30 am - 8 pm	10:30 am - 3:30 pm and 6 - 8 pm	10:30 am - 3:30 pm and 6 - 8 pm	
■ ● ▲	Technical Papers Fast Forward		6 - 8 pm				

Computer Animation Festival

	Event	SUN 2 AUG	MON 3 AUG	TUE 4 AUG	WED 5 AUG	THU 6 AUG	FRI 7 AUG
■ ▲	Evening Theater		6:30 - 9 pm	6:30 - 9 pm	6:30 - 9 pm	6:30 - 9 pm	
■ ▲	Festival Panels		1:45 - 5:30 pm	8:30 am - 5:30 pm		10:30 am - 3:30 pm	
■ ▲	Festival Talks		1:45 - 3:30 pm	3:45 - 5:30 pm	8:30 am - 5:30 pm	8:30 am - 5:30 pm	
■ ▲	Production Sessions		8:30 - 10:15 am	1:45 - 5 pm		10:30 am - 5:30 pm	10:30 am - 12:15 pm
■ ▲	Real Time		6:30 - 7 pm	6:30 - 7 pm	8:30 am - 5:30 pm	8:30 - 10:15 am	
■ ▲	Stereoscopic 3D: Research, Applications, and Entertainment					8:30 am - 8:30 pm	8:30 am - 3:30 pm
■ ▲	Visual Music		8:30 am - 5:30 pm				

Network your senses at SIGGRAPH 2009 and return energized to apply everything you've learned.

AN EXCEPTIONAL RETURN ON INVESTMENT

Knowing that the majority of SIGGRAPH conference attendees rely on their employers to fund their registration and travel in part or in full, we have developed the following value-based talking points for you to share with your boss.

Value

SIGGRAPH is the only place you can find best-practice-based education with an approximate cost of less than $37 per session*, significantly leveraging your organization's training dollars.

Emerging Technologies

Only at SIGGRAPH do the most competitive, bleeding-edge minds in new technologies from around the world come together cooperatively for you to interact and engage with, bringing the future back to your organization today.

Industry Visionaries

SIGGRAPH gives you access to first-hand accounts from industry icons, who were once in your shoes, about how and where their visions and inspiration were born.

Hands-On Know How

Acquiring the most current information in an interactive environment is the only way to protect and leverage the significant investment your company has made in graphics technology.

One-Stop Shopping

With budget time right around the corner, you need to start researching options and opportunities. What better way to start than with hundreds of exhibitors from five continents all in one place?

Personally Relevant Education

One SIGGRAPH week offers hundreds of sessions to choose from, allowing you to tailor a personal education program that ensures you are learning something new and specifically relevant to your organization's needs.

Saves Time

Because, while a week out of the office seems difficult, having to take up to a year to amass the directly relevant information and education you could gain in one week would be downright daunting.

Register Early and Afford More!

If you register early, you can save towards a discount airline ticket, reducing your organization's out-of-pocket costs.

Inspiration

After your SIGGRAPH 2009 experience, you'll return to work rejuvenated, ready to apply your new knowledge and newly inspired creativity.

Update Yourself

Get up to date with the latest developments and accomplishments in all areas of computer graphics and interactive techniques.

* Based on an average attendee's participation in 22 sessions of various types over five days at the SIGGRAPH 2009 Member Discounted Registration rate.

STIMULATE. COLLABORATE. CREATE.

Conference Registration Categories

- ■ Full Conference Access
- ● Basic Access
- ▲ Computer Animation Festival

SIGGRAPH 2009 + New Orleans = the perfect combination for scientists, artists, animators, producers, educators, and executives in computer graphics and interactive techniques.

Five full days of learning all about the latest techniques and products, exploring the next frontiers of computer graphics, and connecting with colleagues and friends from the international SIGGRAPH community.

■ ● ▲
Keynote Speakers

Randy Thom
Designing a Movie for Sound: How to Make Sound a Full Collaborator in the Storytelling Process
Monday, 3 August, 10:30 am - 12:15 pm

Pioneer in sound and two-time Academy Award® winner

Randy Thom has worked on more than 75 films including some of Hollywood's biggest blockbusters such as "Bolt", "Forrest Gump", "Harry Potter and the Chamber of Secrets", "Harry Potter and the Goblet of Fire", "Ratatouille", "War of the Worlds", and "Wild at Heart". He received two Academy Awards® for Best Sound in "The Right Stuff" and Best Achievement in Sound Editing for "The Incredibles".

Will Wright
Playing With Perception
Tuesday, 4 August, 10:30 am - 12:15 pm

Video game designer, creator of Spore™ and The Sims series

Will Wright rose to prominence when he invented SimCity, the widely acclaimed, non-violent, open-ended simulation video game. Since its release 20 years ago, he has introduced The Sims series and several other follow-ups. In 2008, Wright unveiled his latest achievement: Spore™, named by Time Magazine as one of the "50 Best Inventions of 2008".

Steve Duenes
A Visual Response to the News
Wednesday, 5 August, 10:30 am - 12:15 pm

New York Times Graphics Director

Steve Duenes is a leader in transforming complex data into understandable graphic journalism. Duenes started at The New York Times in 1999 as the graphics editor for science, becoming the graphics director in 2004. In his current role, he manages a staff of 30 journalists who work as a team to shape and deliver visual information by researching, writing, designing, and programming the renowned information graphics for both the printed newspaper and nytimes.com.

■ ● ▲
ACM SIGGRAPH Award | Award Presentations: Monday, 3 August, 10:30 am | Award Winner Talks: Monday, 3 August, 1:45-3:30 pm

The Steven Anson Coons Award for Outstanding Creative Contributions to Computer Graphics
This award, presented during odd-numbered years, recognizes long-term creative impact on the field of computer graphics through a personal commitment over an extended period of time.

The Computer Graphics Achievement Award
Awarded annually to recognize a major accomplishment that provided a significant advance in the state of the art of computer graphics and is still significant and apparent.

The Significant New Researcher Award
Awarded annually to a researcher who has made a recent significant contribution to the field of computer graphics and is new to the field. The intent is to recognize people who, though early in their careers, have already made a notable contribution.

The Distinguished Artist Award for Lifetime Achievement in Digital Art
Awarded annually to an artist who has created a substantial and important body of work that significantly advances aesthetic content in the field of digital art.

One-Day registration includes access for one day to conference programs and events associated with that level of registration and all days of the Exhibition (Tuesday-Thursday). One-Day access does not include technical documentation or tickets for the Reception.

Conference Registration Categories

- ■ Full Conference Access
- ● Basic Access
- ▲ Computer Animation Festival

SESSIONS

■ Art Papers →
Tuesday - Wednesday, 4 - 5 August
In collaboration with Leonardo/ISAST, SIGGRAPH 2009 presents peer-reviewed papers that illuminate and explore the process of making art and its place in society, helping the community understand the changing roles of artists and art-making in our increasingly computerized, networked, multi-sensory, online world. The Art Papers are published in a special issue of Leonardo.

■ Courses →
Monday - Friday, 3 - 7 August
Learn from the experts and acquire inside knowledge that expands skills and promotes professional advancement. SIGGRAPH 2009 Courses range from an introduction to the foundations of computer graphics and interactive techniques to advanced instruction on the most current techniques and topics.

■ ● ▲ Exhibitor Tech Talks →
Tuesday - Thursday, 4 - 6 August
Get the inside story direct from the commercial developers of tomorrow's hot hardware, software, and systems. Join question-and-answer exchanges and one-on-one conversations after each presentation by SIGGRAPH 2009 exhibitors.

■ Game Papers →
Tuesday - Thursday, 4 - 6 August
Peer-reviewed papers from the creative and technical communities that develop videogames, and from academic researchers who study videogames and related technologies. The Game Papers are published in The Sandbox 2009: ACM SIGGRAPH Video Game Proceedings issue.

■ Panels →
Monday - Thursday, 3 - 6 August
Leading experts in computer graphics and interactive techniques share experiences, opinions, insights, speculation, disagreement, and controversy with the audience and each other.

■ Talks →
Tuesday - Friday, 4 - 7 August
A broad spectrum of presentations on recent achievements in all areas of computer graphics and interactive techniques, including art, design, animation, visual effects, interactive music, research, interactivity, and engineering.

■ Technical Papers →
Tuesday - Friday, 4 - 7 August
The SIGGRAPH Technical papers program is the premier international forum for disseminating new scholarly work in computer graphics. The Technical Papers is published as a special issue of ACM Transactions on Graphics, the world's most respected research publication in computer graphics and interactive techniques.

GALLERIES & EXPERIENCES

■ ● ART & DESIGN
BioLogic: A Natural History of Digital Life →
Monday - Friday, 3 - 7 August
An art exhibition of international juried installations and interactive art. Like a forward-looking cabinet of curiosities, BioLogic combines biological forms and systems with digital code and networks to explore expressions of life as we know it or imagine it to be.

■ ● ART & DESIGN
Generative Fabrication →
Monday - Friday, 3 - 7 August
The SIGGRAPH 2009 Design & Computation Gallery explores non-linear and biological processes through selected works of art, architecture, and design.

■ ● Emerging Technologies →→
Monday - Friday, 3 - 7 August
Hands-on interaction with innovative technologies and applications in many fields, including displays, robotics, input devices, and haptics.

■ ● ▲ Exhibition →→
Tuesday - Thursday, 4 - 6 August
Your best opportunity to explore this year's new software, hardware, and services offered by vendors from throughout the world. Get up-close and hands-on with the newest hardware systems, software tools, and creative services from hundreds of companies. Explore the products, systems, techniques, ideas, and inspiration that are creating the next three generations of computer graphics and interactive techniques.

■ Geek Bar
Monday - Friday, 3 - 7 August
Real-time human networking. Streaming content from the SIGGRAPH 2009 session rooms. Wireless access. Comfy chairs.

■ ● Information Aesthetics Showcase →→
Monday - Friday, 3 - 7 August
In recognition of the increasingly prominent role of information visualization and data graphics in digitally mediated culture, the Information Aesthetics Showcase presents projects from visualization labs, medical-imaging groups, social-research non-profit organizations, design labs, museums, art programs, and new media centers.

■ ● Posters →→
Monday - Friday, 3 - 7 August
Browse their breakthroughs then talk with the researchers who are leading the evolution of computer graphics and interactive techniques. Posters are displayed throughout the conference week, and presenters discuss their work in scheduled sessions.

■
Reception   Co-sponsored by **Side Effects Software**
Thursday, 6 August
Social and intellectual interaction with the movers and shakers of the international SIGGRAPH community. Plus delectable food and refreshments in a classic New Orleans setting.

Conference Registration Categories
■ Full Conference Access
● Basic Access
▲ Computer Animation Festival

GALLERIES & EXPERIENCES (CONT.)

■ ●
The Sandbox ➔➔
Monday - Friday, 3 - 7 August
Workshop areas for game design, in conjunction with The Studio, featuring toolsets that attendees can use to play games and learn how they are designed, Game-playing stations for games shown in the Real-Time Rendering section of the Computer Animation Festival. IndieCade: An exhibit highlighting innovative, independent game design and development.

■ ●
The Studio ➔➔
Monday - Friday, 3 - 7 August
From 2D and 3D graphics to audio and tactile interfaces, communal networks, and real-time experiences, in The Studio attendees apply tomorrow's hardware and software in hands-on sessions.

CONTESTS & COMPETITIONS

■ ● ▲
ACM Student Research Competition ➔➔
Friday, 7 August
Before the conference, 25 posters are selected for judging at SIGGRAPH 2009. During the conference, a panel of distinguished judges selects five semi-finalists and presents awards at the ACM SRC Final Presentation.

■ ● ▲
FJORG! ➔
Monday - Tuesday, 3 - 4 August
Teams of animators from around the world forgo sleep and resist several staged distractions for 32 non-stop hours to produce the best character-driven animation in the universe. Celebrity judges from the animation industry present the winner of the third annual SIGGRAPH "iron animator" competition on Thursday, 6 August.

■ ● ▲
GameJam! ➔
Tuesday - Wednesday, 4 - 5 August
For 24 action-packed, non-stop hours, teams collaborate to design, implement, and complete the best video game in human history. The results will be demonstrated at the SIGGRAPH GameJam! Awards Ceremony on Thursday, 6 August.

■ ●
Research Challenge ➔➔
Tuesday, 4 August
Individuals and teams develop innovative solutions to a challenge problem, demonstrating their creativity, design, and execution skills. Selected finalists present their work to a panel of distinguished judges in a public session, where final awards are announced.

■ ● ▲
Social Game ➔➔
Monday - Thursday, 3 - 6 August
In this collectible business card game, participants gather business cards from SIGGRAPH 2009 attendees, then use the skills represented by the cards to build a production team and create a game with three "cool features". The game begins on Monday, 3 August, and concludes on Thursday, 6 August, with a live presentation in the Players Lounge.

■ ●
SpeedLab ➔
Sunday, 2 August and Friday, 7 August
In this multi-disciplinary competition, teams are assigned a problem at the beginning of SIGGRAPH 2009, and five days later they present their solutions to a panel of celebrity judges. Solutions are evaluated on their creativity, practicality, and "cool factor". Sign up for a SpeedLab team at the opening session on Sunday, 2 August. Teams are formed based on participants' skills and expertise.

PERFORMANCES & SPECIAL EVENTS

■ ● ▲
Music Perfomances ➔
Monday - Thursday, 3 - 6 August
Performances that combine music with imagery or demonstrate novel interactive techniques.

■ ● ▲
Technical Papers Fast Forward
Monday, 3 August
The world's leading experts in computer graphics and interactive techniques preview the Technical Papers in provocative, sometimes hilarious summaries of the field's evolution.

COMMUNITY

■ ● ▲
Birds of a Feather ➔➔
Monday - Friday, 3 - 7 August
Informal presentations, discussions, and demonstrations, organized by and for people who share interests, goals, technologies, environments, or backgrounds. Review a preliminary list of the Birds of a Feather sessions at: **www.siggraph.org/s2009** ➔➔

To schedule a Birds of a Feather session before the conference, complete the online submission form.

■ ●
International Resources ➔➔
Monday - Friday, 3 - 7 August
Learn how the industry is evolving worldwide and collaborate with attendees from five continents. The International Center offers bilingual tours of SIGGRAPH 2009 programs, informal translation services, and space for meetings, talks, and demonstrations.

■ ● ▲
Job Fair ➔➔
Tuesday - Thursday, 4 - 6 August
Employers and creative professionals connect before the conference via the CreativeHeads. net job board network and candidate profiling system. During SIGGRAPH 2009, they meet at the Job Fair. After the conference, they continue to explore opportunities via the CreativeHeads. net posting and profiling system.

COMPUTER ANIMATION FESTIVAL

Image courtesy of Meats Meier

■ ▲
Computer Animation Festival
Monday - Friday, 3 - 7 August

Experience the most innovative and stimulating work in computer-generated content from narrative animation to scientific and music visualizations and visual music, videogames to real-time simulations, and commercials to visual effects. The Computer Animation Festival features panels, talks, and presentations exploring the latest in production processes, the nuances of visual music, real-time discussions and demonstrations, tools for urban planning and rebuilding after Katrina, special 3D stereoscopic sessions and screenings, of films from computer graphics visionaries.

For complete details on the Computer Animation Festival visit: **www.siggraph.org/s2009**

Special Guest Speaker
Thursday, 6 August | 10:30 am - 12:15 pm

Chris Landreth
Look Closer: Psychologically Driven Animation

Juried Films
The best of this year's visual effects, animated shorts, student animations, scientific and musical visualizations, visual music, experimental subjects, commercials, and more.

Production Sessions ➜
Insider updates on the production secrets behind recent feature films.

Real-Time Rendering
For the first time, the Computer Animation Festival features a section focused entirely on real-time computer graphics: the latest examples of video games and real-time simulations presented on their actual platforms. Selected works will also be available for attendees to try in The Sandbox.

Sessions
Presentations and discussions on the process of creating films, behind-the-scenes developments, virtual tools, production-related art, and related subjects.

Partial list of sessions:

Getting a Job in CG for Entertainment: Visual Effects, Animation, and Games ➜
Monday, 3 August | 1:45 - 3:30 pm

Keeping a Job in CG for Entertainment: Visual Effects, Animation, and Games ➜
Monday, 3 August | 3:45 - 5:30 pm

See What You Feel: A Study in the Visual Extension of Music ➜
Monday, 3 August | 6 - 8 pm

Building Digital Cities ➜
Tuesday, 4 August | 9:30 - 10:15 am

Visual Music
A selection of the world's best artworks that combine music and images, created by solo filmmakers or as part of a collaboration.

The Making of "Shade Recovered": Networked Senses at Play Course ➜
Monday, 3 August | 8:30 - 10:15 am

Visual Music Talks ➜
Monday, 3 August | 1:15 - 5:30 pm

Computer Animation Festival Award Nominees
Since 1999, the SIGGRAPH Computer Animation Festival has been an official qualifying festival for the Academy of Motion Picture Arts and Sciences "Best Animated Short Film" award. Nominees for this year's Computer Animation Festival Awards and Prizes are:

Best of Show Nominees

Angel Afoot
Jakob Schuh & Saschka Unseld

French Roast
Fabrice O. Joubert

Silhouettes of Jazz
Martin-Sebastian Senn

Jury Award Nominees

Dix
Bif

Love_Child
Sheng-Wen Shiao

Anima
Julien Lasbleiz, Nicolas Maurice, Remi Devouassoud, and Elliott Kajdan

Student Prize Nominees

Dim Sum
Jin Sop Kum

Incident at Tower 37
Chris Perry

Project: Alpha
Matthias Bjarnason

Well Told Fable Award

friends?
Sveinbjorn J. Tryggvason

Unbelievable Four
Sukwon Shin

Frenet 1,882 "Mini Cab Company"
Armando Bo

SIGGRAPH BY FOCUS: GAMES

The buzz is building in the international games community. SIGGRAPH 2009, this year's edition of the premier conference on computer graphics and interactive techniques, is the place to be. Don't miss these sessions, shows, and opportunities:

Keynote Speaker →

Will Wright, video game designer, creator of Spore and The Sims series

Game Papers →

The latest breakthroughs in game design, development, and research. The Game Papers are published in the Sandbox 2009: ACM SIGGRAPH Video Game Proceedings issue.

Social Game →

In this collectible business card game, participants gather business cards from SIGGRAPH 2009 attendees, then use the skills represented by the cards to build a production team and create a game with three "cool features". The game begins on Monday, 3 August, and concludes on Thursday, 6 August, with a live presentation in the Players Lounge.

Courses

Advances in Real-Time Rendering in 3D Graphics and Games I →
Monday, 3 August | 8:30 am - 12:15 pm

Advances in Real-Time Rendering in 3D Graphics and Games II →
Monday, 3 August | 1:45 - 5:30 pm

Panels

Getting a Job in CG for Entertainment: Visual Effects, Animation, and Games → FESTIVAL
Monday, 3 August | 1:45 - 3:30 pm

Keeping a Job in CG for Entertainment: Visual Effects, Animation, and Games → FESTIVAL
Monday, 3 August | 3:45 - 5:30 pm

Instigating Change: Models for Positive Games →
Wednesday, 5 August | 1:45 - 3:30 pm

The Art History of Games →
Thursday, 6 August | 8:30 - 10:15 am

Simulated Physics in Games →
Thursday, 6 August | 10:30 am - 12:15 pm

Talks

Immersive and Impressive: The Impressionistic Look of Flower on the PS3 → FESTIVAL
Wednesday, 5 August | 3:45 - 5:30 pm

Building Story in Games: No Cut Scenes Required → FESTIVAL
Thursday, 6 August 10:30 am - 12:15 pm

Doing It With Game Engines →
Friday, 7 August | 8:30 - 10:15 am

Production Session

Big, Fast and Cool: Making the Art for Fight Night 4 & Gears of War 2 → FESTIVAL
Wednesday, 5 August | 10:30 am - 12:15 pm

Real-Time Rendering →→

Live demos of video games and real-time simulations

The Sandbox →→

The best recent work in experimental, independent game development

GameJam! →→

Twenty-four-hour contest to produce the best game in human history

The Exhibition →→

All the products you need to create, produce, and excel

Job Fair →→

Worldwide career opportunities

Transformers: The Game © 2008 Blur Studio, Inc.

SIGGRAPH BY FOCUS: MUSIC AND AUDIO

For over 35 years, SIGGRAPH has been the premier conference for showcasing computer graphics and work in interactive techniques. The primary focus is on the visual, but that's just one sense among many. SIGGRAPH 2009 is highlighting the strongly related areas of music and audio, because:

- Audiences absorb visual stories as complete experiences.
- Multimodal communication and interaction can enhance or surpass visual-only experiences.
- Creating and editing music and audio define an important area of study in interactive techniques.

Music has an extra special connection for SIGGRAPH 2009 as we return to New Orleans, the birthplace of jazz and a vital melting pot of American music. SIGGRAPH 2009 includes:

Keynote Speaker →

Randy Thom
Monday, 3 August | 10:30 am - 12:15 pm
Pioneer in sound and two-time Academy Award® winner

Panel

The Visual in New Interfaces for Musical Expression →
Tuesday, 4 August | 10:30 am - 12:15 pm

The Studio →

In cooperation with the New Interfaces for Musical Expression (NIME) symposium, The Studio includes technology, software, and expert help for creating new musical interfaces.

Courses

Creating New Interfaces for Musical Expression →
Tuesday, 4 August | 1:45 - 5:30 pm

Interactive Sound Rendering →
Wednesday, 5 August | 8:30 am - 12:15 pm

Talks

See, Hear, Make, and Play →
Wednesday, 5 August | 3:45 - 5:30 pm

Music as Multi Sense →
Thursday, 6 August | 3:45 - 5:30 pm

Music Performances →

Performances that combine music with imagery or demonstrate novel interactive techniques.

Visual Music   FESTIVAL

The Making of "Shade Recovered": Networked Senses at Play Course →
Monday, 3 August | 8:30 - 10:15 am

Visual Music Talks →
Monday, 3 August | 1:15 - 5:30 pm

Registration

Sunday, 2 August	2 - 6 pm
Monday, 3 August	7:30 am - 6 pm
Tuesday, 4 August	8 am - 6 pm
Wednesday, 5 August	8 am - 6 pm
Thursday, 6 August	8 am - 6 pm
Friday, 7 August	8 am - 3:30 pm

Galleries & Experiences*

Monday, 3 August	9 am - 6 pm
Tuesday, 4 August	9 am - 6 pm
Wednesday, 5 August	9 am - 6 pm
Thursday, 6 August	9 am - 6 pm
Friday, 7 August	9 am - noon

* BIOLOGIC: A NATURAL HISTORY OF DIGITAL ART
EMERGING TECHNOLOGIES
GEEK BAR
GENERATIVE FABRICATION
INFORMATION AESTHETICS SHOWCASE
POSTERS
THE SANDBOX
THE STUDIO

Sunday, 2 August

2 - 6 pm
- **International Resources**

4 - 5 pm
- **Speedlab**

Monday, 3 August

7:30 am - 6 pm
- **International Resources**

8:30 - 10:15 am
- **Course:** The Making of "Shade Recovered": Networked Senses at Play
- **Production Session:** Building Benjamin Button: A Blending of "Technique-ologies"
- **Talks:** Information Aesthetics: Designing Interactions

8:30 am - 12:15 pm
- **Course:** Advances in Real-Time Rendering in 3D Graphics and Games I

9 am - Midnight
- **FJORG!**

10:30 am - 12:15 pm
- **Keynote Speaker:** Randy Thom
- **ACM SIGGRAPH Award Presentation**

1:15 - 5:30 pm
- **Talks:** Visual Music

1:45 - 3:30 pm
- **ACM SIGGRAPH Award Talks**
- **Panel:** Getting a Job in CG for Entertainment: Visual Effects, Animation, and Games
- **Talks:** Splashing in Pipelines

1:45 - 5:30 pm
- **Course:** Introduction to Computer Graphics
- **Course:** Advances in Real-Time Rendering in 3D Graphics and Games II
- **Course:** The Whys, How Tos, and Pitfalls of User Studies

3:45 - 5:30 pm
- **Panel:** Keeping a Job in CG for Entertainment: Visual Effects, Animation, and Games
- **Panel:** The State of Aesthetic Computing or Info-Aesthetics
- **Panel:** Career Snapshot
- **Talks:** Making It Move

6 - 8 pm
- **Technical Papers Fast Forward**
- **Talk/Music Performance:** See What You Feel: A Study in the Visual Extension of Music

6:30 - 9 pm
- **Festival:** Evening Theater

Tuesday, 4 August

12:01 am - 5 pm
- **FJORG!**

8 am - 6 pm
- **International Resources**

8:30 - 10:15 am
- **Course:** Real-Time Global Illumination for Dynamic Scenes
- **Course:** Acquisition of Optically Complex Objects and Phenomena
- **Game Papers:** Supporting Social and Persuasive Play
- **Papers:** Fast Image Processing and Retargeting
- **Papers:** Curve and Surface Modeling (TOG)
- **Talks:** Art and Interaction
- **Talks:** Education: Learning and the Studio

9:30 - 10:15 am
- **Panel:** Building Digital Cities

9:30 am - 6 pm
- **Exhibition**
- **Exhibitor Tech Talks**

10 am - 4 pm
- **Job Fair**

10:30 am - 12:15 pm
- **Keynote Speaker:** Will Wright
- **Panel:** The Visual in New Interfaces for Musical Expression
- **Papers:** Perception and Depiction

12:15 - 1:15 pm
- **Poster Sessions**

1:45 - 3:30 pm
- **Papers:** Light and Materials
- **Papers:** Shape Editing and Deformation
- **Research Challenge Judging Ceremony**

1:45 - 5:30 pm
- **Production Session:** Robots, Cyborgs, and the Final Frontier: An Inside Look at "Transformers: Revenge of the Fallen", "Terminator Salvation", and "Star Trek"

1:45 - 5:30 pm
- **Course:** An Introduction to Shader-Based OpenGL Programming
- **Course:** Color Imaging
- **Course:** Creating New Interfaces for Musical Expression

3:45 - 5:30 pm
- **Art Papers:** Strategies: Art Making and Viewing in Today's Technological and Social Realm
- **Course:** Point Based Graphics – State of the Art and Recent Advances
- **Game Papers:** Game Mechanics and Design Projects

3:45 - 6 pm
- **Papers:** Fluid Simulation

6 pm - Midnight
- **GameJam!**

6 - 8 pm
- **Music Performance:** Pandeiro Funk: Experiments on Rhythm-Based Interaction
- **Talks:** Taking Care of Your Pet

6:30 - 9 pm
- **Festival:** Evening Theater

Conference Schedule

Subject to change.

Wednesday, 5 August

12:01 am - 6 pm
- **GameJam!**

8 am - 6 pm
- **International Resources**

8:30 - 10:15 am
- **Game Papers:** Kinesthetic Movement in Games I
- **Panel:** The Future of Teaching Computer Graphics for Students in Engineering, Science, and Mathematics
- **Papers:** Image Warping and Interpolation
- **Papers:** Motion Synthesis and Editing (TOG)
- **Talks:** Painterly Lighting

8:30 am - 12:15 pm
- **Course:** Build Your Own 3D Scanner: 3D Photography for Beginners
- **Course:** Interactive Sound Rendering

9:30 am - 6 pm
- **Exhibition**
- **Exhibitor Tech Talks**

10 am - 4 pm
- **Job Fair**

10:30 am - 12:15 pm
- **Keynote Speaker:** Steve Duenes
- **Papers:** Surfaces
- **Production Session:** Big, Fast and Cool: Making the Art for Fight Night 4 & Gears of War 2

1:45 - 3:30 pm
- **Art Papers:** Stitching it Together: Technology and Aesthetics in the Wearable and Natural
- **Music Performances:** envyCODE and Improvisation With The TOOB
- **Panel:** Instigating Change: Models for Positive Games
- **Papers:** Reduced Physics for Animation
- **Production Session:** Making of "Cloudy With a Chance of Meatballs" in Stereo and Mono
- **Talks:** Two Bolts and a Button
- **Talks:** Capture and Display

1:45 - 5:30 pm
- **Course:** Efficient Substitutes for Subdivision Surfaces
- **Course:** Advanced Illumination Techniques for GPU Volume Raycasting

3:45 - 5:30 pm
- **Course:** Next Billion Cameras
- **Papers:** Imaging and Rendering Pipeline (TOG)
- **Talks:** Explorations in Art and Design
- **Talks:** See, Hear, Make, and Play
- **Talk:** Immersive and Impressive: The Impressionistic Look of Flower on the PS3

3:45 - 6 pm
- **Papers:** Creating Natural Variations

6 - 8 pm
- **Music Performances:** Sergi Jorda on Reactable

6:30 - 9 pm
- **Festival:** Evening Theater

Thursday, 6 August

8 am - 6 pm
- **International Resources**

8:30 - 10:15 am
- **Course:** Visual Perception of 3D Shape
- **Panel:** The Art History of Games
- **Papers:** Character Animation I
- **Papers:** Rendering Methods and Systems (TOG)

8:30 am - 12:15 pm
- **Course:** Beyond Programmable Shading I

9:30 am - 3:30 pm
- **Exhibition**
- **Exhibitor Tech Talks**

10 am - 1 pm
- **Job Fair**

10:30 am - 12:15 pm
- **Festival Special Guest Speaker:** Chris Landreth
- **Panel:** BioLogic and Generative Fabrication
- **Panel:** Simulated Physics in Games
- **Papers:** Interacting With Hands, Eyes, and Images
- **Production Session:** The Mass Animation Project and the Future of Crowd-Sourced Creativity
- **Production Session:** Monsters vs. Stereo: How Stereo Affected Production on "Monsters vs. Aliens"
- **Talks:** Effects Omelette
- **Talk:** Building Story in Games: No Cut Scenes Required

12:15 - 1:15 pm
- **Poster Sessions**

1:45 - 3:30 pm
- **Course:** The Digital Emily Project: Photoreal Facial Modeling and Animation
- **Game Papers:** Kinesthetic Movement in Games II
- **Music Performance:** Silent Drum
- **Papers:** Visual, Cut, Paste, and Search
- **Papers:** Modeling and Rendering Dynamic Shapes (TOG)
- **Production Session:** G-Force 3D: Guinea Pigs, Gadgets and the Stereoscopic Post-Production Workflow

1:45 - 5:30 pm
- **Course:** Beyond Programmable Shading II
- **Course:** Scattering

3:45 - 5:30 pm
- **Game Papers:** 3D and the Cinematic in Games
- **Panel:** Short-Cuts to Reality: The Art and Compromise of Software Development for Physics-Based VFX
- **Papers:** Shape Analysis
- **Production Session:** "Coraline" The Changing Face of Animation
- **Talks:** Music as Multi Sense

6 - 8 pm
- **FJORG! and GameJam! Judging Ceremony**
- **Music Performance:** And Then, Romina…

6:30 - 9 pm
- **Festival:** Evening Theater

8 - 10 pm
- **Reception**

Friday, 7 August

8 am - 3:30 pm
- **International Resources**

8:30 - 10:15 am
- **Papers:** Meshing
- **Talks:** Rendering
- **Talks:** Doing It With Game Engines

8:30 am - 12:15 pm
- **Course:** Realistic Human Body Movement for Emotional Expressiveness
- **Course:** Interaction: Interfaces, Algorithms, and Applications
- **Course:** Shape Grammars

10:30 am - 12:15 pm
- **ACM Student Research Competition**
- **Papers:** Character Animation II
- **Papers:** Vector Graphics and Point Distributions
- **Talks:** Real Fast Rendering

1:45 - 3:30 pm
- **Papers:** Physically Based Modeling: From Contact to Capture
- **Papers:** Rendering and Visibility

1:45 – 5:30 pm
- **Course:** Computation & Cultural Heritage: Fundamentals and Applications
- **Course:** Visual Algorithms in Post-Production
- **Course:** Advanced Material Appearance Modeling
- **Speedlab Judging Ceremony**

3:45 - 5:30 pm
- **Papers:** Computational Cameras
- **Talks:** Character Animation and Rigging

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☐ Full Conference Access

ART PAPERS

Art Papers illuminate and explore the changing roles of artists and art making in our increasingly computerized, networked, multi-sensory, online world. Art Papers present excellent ideas in accessible ways. They inform artistic disciplines, set standards, and stimulate future trends.

The peer-reviewed Art Papers are published in a special issue of *Leonardo, The Journal of the International Society of the Arts, Sciences and Technology*. The issue also includes visual documentation of the works exhibited in BioLogic: A Natural History of Digital Life.

Strategies: Art Making and Viewing in Today's Technological and Social Realm

Tuesday, 4 August | 3:45 - 5:30 pm

Session Chair
Mine Özkar
Middle East Technical University

Experimental Interaction Unit: Commodities of Mass Destruction

This paper describes several projects by the collective Experimental Interaction Unit, that use product design, software engineering and digital networking to uncover collective behaviors that contribute to systems of social control. Biology and human behavioral studies are essential aspects of this critique.

Anuradha Vikram
Curative Projects

MobiSpray: Mobile Phone as Virtual Spray Can for Painting BIG Anytime Anywhere on Anything

MobiSpray combines a mobile phone, a PC, and a video projector into a novel art tool that liberates and empowers artists to change the environment with large-scale artistic expressions.

Jürgen Scheible
University of Art and Design Helsinki

Timo Ojala
University of Oulu

A New System to Appreciate the Visual Characteristics of a Painting

This paper explores development and evaluation of a painting viewing system that enables users to perceive the visual links between multiple paintings as semantic elements.

Tsutomu Miyashita
DNP Digitalcom Co., Ltd.

Souvenirs du Monde des Montagnes

Souvenirs du Monde des Montagnes offers a new language to bring the real and virtual worlds closer together, to weave new meanings between the visible and the invisible, and to bridge the gap between tradition and contemporary performing art.

Camille Scherrer
EPFL+ECAL Lab

Julien Pilet
Keio University

Vincent Lepetit
Pascal Fua
École Polytechnique Fédérale de Lausanne

Stitching it Together: Technology and Aesthetics in the Wearable and Natural

Wednesday, 5 August | 1:45 - 3:30 pm

Session Chair
Joanna Berzowska
Concordia University

Wearable Forest Clothing System: Beyond Human-Computer Interaction

Wearable Forest is a garment that bioacoustically interacts with distant wildlife in a remote forest through a remote-controlled speaker and microphone. This networked interactive sound system can create a sense of unity between users and a remote soundscape.

Hiroki Kobayashi
Ryoko Ueoka
Michitaka Hirose
The University of Tokyo

Re-Visioning the Interface: Technological Fashion as Critical Media

An examination of the trend toward miniaturization of wearable technologies and its context in discourses on art and the body.

Susan Elizabeth Ryan
Louisiana State University

The 200 Year Continuum

The 200 Year Continuum is a collection of prophetic mythologies that discuss society's relationship to advancing technologies and their effects on the natural world.

Christian Kerrigan
AVATAR

Seating in Courses is on a first-come, first-served basis. Please be sure to arrive early for the Courses you wish to attend. All the Course Notes are on the Full Conference DVD-ROM that Full Conference attendees receive with their registration.

COURSES

Learn from the experts in the field and gain inside knowledge that is critical to career advancement. Courses deliver unique learning opportunities, available only at SIGGRAPH 2009, in three levels of difficulty (Introductory, intermediate, and advanced).

The Making of "Shade Recovered": Networked Senses at Play   FESTIVAL

Monday, 3 August | 8:30 - 10:15 am
Level: Intermediate

Explores the underlying concepts and workflow of integrating sound and images in the authors composition and design of "Shade Recovered".

Instructor
Jean Detheux
Independent Mixed-Media Artist

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This course is open to attendees in two registration categories: Computer Animation Festival and Full Conference. All other courses require Full Conference registration.

Advances in Real-Time Rendering in 3D Graphics and Games I

Monday, 3 August | 8:30 am - 12:15 pm
Level: Intermediate

Advances in real-time graphics research and the increasing power of mainstream GPUs has generated an explosion of innovative algorithms suitable for rendering complex virtual worlds at interactive rates. Every year, the latest video games display a vast variety of sophisticated algorithms that power ground-breaking 3D rendering and push the visual boundaries and interactive experience of rich environments.

This course covers a series of topics on the best practices and techniques prevalent in state-of-the-art rendering in several award-winning games, and describes innovative and practical 3D rendering research breakthroughs that will be used in the games of tomorrow. The course is designed for technical practitioners and developers of graphics engines for visualization, games, or effects rendering. Presented techniques are applicable in real-time and off-line domains. Attendees will acquire a number of highly optimized algorithms in various areas of real-time rendering.

Instructors
Natalya Tatarchuk
Hao Chen
Bungie LLC

Alex Evans
Media Molecule

Anton Kaplanyan
Crytek

Wolfgang Engel
Rockstar

David Jefferies
Jeremy Moore
Disney Interactive

Introduction to Computer Graphics   FESTIVAL

Monday, 3 August | 1:45 - 5:30 pm
Level: Introductory

Computer graphics is a broad and deep subject, and getting the most out of attending the annual SIGGRAPH conference requires a good understanding of the core ideas that lie at the heart of our existing techniques and future innovations. This course presents live demos of popular 2D and 3D software to demonstrate the key ideas that enable creation of scientific imagery, feature movies, interactive art, and more.

In the world of 3D, the course shows how to use basic shapes to create complex objects and demonstrates how to move and manipulate those objects over time to create motion. It also shows how to generate images that communicate these models to the world and string the images together to create animation. In the world of 2D, the course follows roughly the same approach but looks more closely at how today's rich 2D development environments allow us to manipulate photos and create interactive installations in which users can explore their data, control simulations, or create new artwork.

Instructor
Andrew Glassner

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This course is open to attendees in three registration categories: Computer Animation Festival, Basic Conference Access, and Full Conference. All other courses require Full Conference registration.

Advances in Real-Time Rendering in 3D Graphics and Games II

Monday, 3 August | 1:45 - 5:30 pm
Level: Intermediate

This course is a continuation of Advances in Real-Time Rendering in 3D Graphics and Games I.

The Whys, How Tos, and Pitfalls of User Studies

Monday, 3 August | 1:45 - 5:30 pm
Level: Introductory

Members of the SIGGRAPH community are both consumers and producers of algorithms that make images and techniques that let us interact with visual applications. This course explains the essential role of user studies in insuring that algorithms, products, and content are effective for their intended purposes. The course introduces user studies through real examples and case studies that highlight good practices and warn of mistakes that can compromise evaluation. The cases are chosen to demonstrate the range of the application of user studies in computer graphics (for example, in developing better algorithms and in evaluating images and interaction techniques.)

Instructors
Veronica Sundstedt
Trinity College Dublin

Mary Whitton
University of North Carolina at Chapel Hill

Marina Bloj
University of Bradford

Real-Time Global Illumination for Dynamic Scenes

Tuesday, 4 August | 8:30 - 10:15 am
Level: Intermediate

Global illumination is an important factor in creating realistic scenes and provides visual cues for understanding scene geometry. However, global illumination is very costly and only recently has it become viable to render scenes with global-illumination effects at interactive frame rates by exploiting the parallelism and programmability of modern GPUs.

This course provides a concise overview of recent GPU-based global-illumination techniques that support fully dynamic scenes, compares them, and discusses their various strengths and weaknesses. After introducing the necessary foundation (rendering equation, direct vs. indirect illumination, etc.), the course summarizes the three main streams of real-time global illumination techniques: virtual point lights, screen-space techniques, and hierarchical finite elements.

Instructors
Carsten Dachsbacher
Universität Stuttgart

Jan Kautz
University College London

Acquisition of Optically Complex Objects and Phenomena

Tuesday, 4 August | 8:30 - 10:15 am
Level: Advanced

Standard range-scanning techniques work well for approximately Lambertian reflectors, but large classes of objects can currently not be scanned robustly. Specular and refractive objects pose challenges to range scanning because the surface cannot be observed directly. Translucent objects exhibit significant effects of global light transport, while volumetric phenomena like fire, smoke, and plasma effects do not have a proper surface. Recent research has led to the development of feasible and surprisingly accurate scanning approaches for these types of objects. This course introduces the major theoretical findings, practical setups, and experimental results for digitization of optically complex objects and phenomena.

Instructors
Ivo Ihrke
Wolfgang Heidrich
University of British Columbia

An Introduction to **FESTIVAL** Shader-Based OpenGL Programming

Tuesday, 4 August | 1:45 - 5:30 pm
Level: Introductory

OpenGL is the most widely available application programming interface (API) for creating applications in almost every area of computer graphics including research, scientific visualization, entertainment and visual effects, computer-aided design, interactive gaming, and many more. Over the past decade, OpenGL has evolved to a large API with multiple, sometimes incompatible, versions. Recent versions of OpenGL have become shader-based, and the original fixed-function pipeline may not be available.

This course provides an accelerated introduction to creating applications using these recent versions of OpenGL API. It introduces the most recent version of OpenGL, in which an application must provide vertex and fragment shaders and cannot rely on a fixed-function pipeline. Consequently, this course is a complete rewrite of the OpenGL course that has been taught at the annual SIGGRAPH conference for over 10 years.

Instructors
Edward Angel
University of New Mexico

Dave Shreiner
ARM Ltd.

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This course is open to attendees in three registration categories: Computer Animation Festival, Basic Conference Access, and Full Conference. All other courses require Full Conference registration.

Color Imaging

Tuesday, 4 August | 1:45 - 5:30 pm
Level: Intermediate

The study of color combines a unique mixture of physics and human visual perception, which in practice makes this seemingly straightforward topic challenging and often misunderstood. This course covers the basics of physical and perceptual processes, and demonstrates how color science can be appropriately applied to various applications in rendering, high-dynamic-range imaging, and image manipulation. It is specifically designed for students and professionals who need an understanding of color science as a side-line to their own work, especially those who design algorithms in computer graphics, computer vision, and image processing. It provides a basic understanding of how color science supports design of effective algorithms, and often leads to lower storage requirements, enhanced computational complexity, and better visual quality.

Instructors
Erik Reinhard
Univerisity of Bristol

Greg Ward
Dolby Canada

Garrett Johnson
Apple Computer, Rochester Institute of Technology

Creating New Interfaces for Musical Expression

Tuesday, 4 August | 1:45 - 5:30 pm
Level: Introductory

Advances in digital audio technologies have led to computers playing a role in most music production and performance. Digital technologies offer unprecedented opportunities for creation and manipulation of sound, but the flexibility of these new technologies imply an often-confusing array of choices for instrument designers, composers, and performers.

This course covers the theory and practice of new musical-interface design and explores principles that are useful for designing good musical interfaces. Topics include: mapping from human action to musical output, control intimacy, tools for creating musical interfaces (sensors and microcontrollers, audio synthesis techniques, and communication protocols such as Open Sound Control and MIDI). The course complements the hands-on session on building a musical controller, presented in The Studio.

Instructors
Sid Fels
University of British Columbia

Michael Lyons
Ritsumeikan University

Point Based Graphics – State of the Art and Recent Advances

Tuesday, 4 August | 3:45 - 5:30 pm
Level: Introductory

This course presents the latest research results in point-based computer graphics. It begins with a discussion of novel concepts for mathematical representation of point-sampled shapes, focusing on moving least squares, spherical MLS, and robust statistics. Next, it addresses efficient algorithms for digital geometry processing and modeling of point models, including filtering, re-sampling, spectral processing, and deformation. This section covers high-quality rendering methods for point samples, such as EWA splatting and ray tracing, and explains hardware architectures for efficient point processing and rendering. The last part of the course summarizes how point representations can be utilized in the context of physically based animation.

Instructor
Markus Gross
ETH Zürich

Build Your Own 3D Scanner: 3D Photography for Beginners

Wednesday, 5 August | 8:30 am - 12:15 pm
Level: Introductory

Over the last decade, digital photography has entered the mainstream with inexpensive, miniaturized cameras for consumer use. Digital projection is poised to make a similar breakthrough, with a variety of vendors offering small, low-cost projectors. As a result, active imaging is a topic of renewed interest in the computer graphics community. In particular, low-cost homemade 3D scanners are now within reach of students and hobbyists with a modest budget.

This course provides a beginner with the necessary mathematics, software, and practical details to leverage projector-camera systems in their own 3D scanning projects. An example-driven approach is used throughout; each new concept is illustrated using a practical scanner implemented with off-the-shelf parts. The course concludes by detailing how these new approaches are used in rapid prototyping, entertainment, cultural heritage, and web-based applications.

Instructors
Douglas Lanman
Gabriel Taubin
Brown University

Interactive Sound Rendering

Wednesday, 5 August | 8:30 am - 12:15 pm
Level: Introductory

An overview of algorithmic and software technologies related to interactive sound rendering. The course lectures cover three main topics: physically based techniques to synthesize sounds generated from colliding objects or liquid sounds, efficient computation of sound propagation paths based on reflection or diffraction paths and converting those paths into audible sound, exploiting the computational capabilities of current multi-core commodity processors for real-time sound propagation and sound rendering for gaming and interactive applications. The presentations include audio demonstrations that show the meaning of various processing components in practice.

Instructors
Dinesh Manocha
Ming Lin
University of North Carolina at Chapel Hill

Paul Calamia
Princeton University

Lauri Savioja
Helsingin Yliopisto

Nicolas Tsingos
Dolby Laboratories, Inc.

Advanced Illumination Techniques for GPU Volume Raycasting

Wednesday, 5 August | 1:45 - 5:30 pm
Level: Intermediate

Volume raycasting techniques are important for both visual arts and visualization. They allow efficient generation of visual effects and visualization of scientific data obtained by tomography or numerical simulation. Volume-rendering techniques are also effective for direct rendering of implicit surfaces used for soft-body animation and constructive solid geometry.

The focus of this course is on volumetric illumination techniques that approximate physically based light transport in participating media. Such techniques include interactive implementation of soft and hard shadows, ambient occlusion, and simple Monte Carlo-based approaches to global illumination, including translucency and scattering.

Instructors
Christof Rezk-Salama
Universität Siegen

Markus Hadwiger
VRVIS Research Center

Timo Ropinski
Universität Münster

Patric Ljung
Siemens Corporate Research

Efficient Substitutes for Subdivision Surfaces

Wednesday, 5 August | 1:45 - 5:30 pm
Level: Intermediate

The goal of this course is to familiarize attendees with the practical aspects of subdivision surfaces for which we introduce substitutes for increased efficiency in real-time applications. The course starts by highlighting the properties that make SubD modeling attractive and introduces some recent techniques to capture these properties by alternative surface representations with a smaller foot-print. We list and compare the new surface representations and focus on their implementation on current and next-generation GPUs. Among the advantages and disadvantages of each approach, we address crucial practical issues, such as watertight evaluation, creases and corners, seamless displacement mapping, cache optimization. Finally and most importantly, Valve and Industrial Light Magic will present a few breathtaking practical examples and demonstrate how these advanced techniques have been adopted into their gaming and movie production pipelines.

Instructors

Tianyun Ni
NVIDIA Corporation

Jörg Peters
University of Florida

Ignacio Castaño
NVIDIA Corporation

Jason Mitchell
Valve Corporation

Philip Schneider
Vivek Verma
Industrial Light & Magic

Next Billion Cameras

Wednesday, 5 August | 3:45 - 5:30 pm
Level: Introductory

What will a camera look like 10 years from now? How should we change the camera to improve mobile photography? How will a billion networked and portable cameras change the social culture? How can we use bio-inspired processing to decompose sensed values into perceptually critical elements? How will online photo collections transform visual social computing?

Capture and analysis of visual information plays an important role in photography, art, medical imaging, tele-presence, worker safety, scene understanding, and robotics. But current computational approaches analyze images from single cameras that have only limited abilities. Cameras of the future will exploit unusual optics, novel illumination, and emerging sensors. A significant enhancement in the next billion cameras to support scene analysis and mechanisms for superior metadata tagging for effective sharing will bring about a revolution in visual communication. This course explores the trends and issues associated with that revolution.

Instructors

Ramesh Raskar
Media Lab, Massachusetts Institute of Technology

Steve Seitz
University of Washington

Alexei Efros
Carnegie Mellon University

Visual Perception of 3D Shape

Thursday, 6 August | 8:30 - 10:15 am
Level: Introductory

The human brain has the remarkable ability to turn 2D retinal images of an object into a vivid perception of the object's 3D shape. Mathematically, this should be impossible, and yet we do it effortlessly whenever we open our eyes. How does the brain achieve this? This course presents a number of key findings from the study of human visual perception of 3D shape. It shows how different sources of image information such as contours, texture gradients, shading, and optic flow each contribute to the reconstruction of 3D shape by the human visual system. The course also summarizes what happens when 3D shape perception fails, leading to some cool illusions, and describes current ideas about how 3D shapes are parsed and represented, and relates these ideas to theories of 2D shape encoding. Throughout the course, connections will be made to common practices in the artistic depiction of 3D form. The course concludes with a discussion of how an understanding of human shape perception might be leveraged to enhance 3D shape visualization in photorealistic and non-photorealistic rendering. This course should be of interest to graphics researchers and practitioners who want to understand the portrayal of shape and, more broadly, anyone who is curious about human vision.

Instructors

Roland Fleming
MPI for Biological Cybernetics

Manish Singh
Rutgers - New Brunswick

Beyond Programmable Shading I

Thursday, 6 August | 8:30 am - 12:15 pm
Level: Intermediate

There are strong indications that the future of interactive graphics programming is a more flexible model than today's OpenGL/Direct3D pipelines. Graphics developers need a basic understanding of how to combine emerging parallel programming techniques and more flexible graphics processors with the traditional interactive rendering pipeline. As the first in a series, this course introduces the trends and directions in this emerging field. Topics include: parallel graphics architectures, parallel programming models for graphics, and game-developer investigations of the use of these new capabilities in future rendering engines.

Instructors

Aaron Lefohn
Intel Corporation

Michael Houston
AMD Corporation

Kayvon Fatahalian
Stanford University

Tim Foley
Stanford University,
Intel Corporation

Johan Andersson
DICE

Cass Everitt
Id Software

The Digital Emily Project: Photoreal Facial Modeling and Animation

Thursday, 6 August | 1:45 - 3:30 pm
Level: Intermediate

This course describes how high-resolution face scanning, advanced character rigging, and performance-driven facial animation were combined to create Digital Emily, a believably photorealistic digital actor. Actress Emily O'Brien was scanned in the USC ICT light stage in 35 different facial poses using a new high-resolution face-scanning process capable of capturing geometry and textures down to the level of skin pores and fine wrinkles. These scans were assembled into a rigged digital character, which could then be driven by Image Metrics video-based facial animation technology. The real Emily was captured speaking on a small set, and her movements were used to drive a complete digital face replacement of her character, including its diffuse, specular, and animated displacement maps. HDRI lighting reconstruction techniques were used to reproduce the lighting on her original performance. The most recent results show new real-time animation and rendering research for the Digital Emily character.

Instructors
Paul Debevec
Institute for Creative Technologies,
University of Southern California

Oleg Alexander
Image Metrics, Ltd.

Mike Rogers
Image Metrics, Ltd.

Matt Chiang
Institute for Creative Technologies,
University of Southern California

Beyond Programmable Shading II

Thursday, 6 August | 1:45 - 5:30 pm
Level: Intermediate

This second course in the series Beyond Programmable Shading presents the state of the art in combining traditional rendering API usage with advanced task- and data-parallel computation to increase the image quality of interactive graphics.

Leaders from graphics hardware vendors, game development, and academic research present case studies that show how general parallel computation is being combined with the traditional graphics pipeline to boost image quality and spur new graphics algorithm innovation. Each case study discusses the mix of parallel programming constructs, details of the graphics algorithm, and how the rendering pipeline and computation interact to achieve the technical goals. Presenters also discuss integrating a combination of GPU and CPU techniques for more efficient and flexible algorithms. The focus is on what currently can be done, how it is done, and near-future trends. Topics include: interactive realistic lighting, advanced geometry-processing pipelines, in-frame data structure construction, complex image processing, and rasterization versus ray tracing.

Instructors
Michael Houston
AMD Corporation

Aaron Lefohn
Intel Corporation

Ulf Assarsson
Chalmers University

Justin Hensley
AMD Corporation

Paul Lalonde
Intel Corporation

David Luebke
NVIDIA Research

Scattering

Thursday, 6 August | 1:45 - 5:30 pm
Level: Intermediate

Most of current computer-generated imagery represents scenes with clear atmospheres, neglecting light scattering effects, and most computer-vision systems have not enjoyed success when deployed in uncontrolled outdoor environments. Nevertheless, scattering is a fundamental aspect of light transport in a wide range of applications, whether simulating it or interpreting it, from medical imaging to driving simulators or underwater imagery. This course addresses the challenges that arise with light scattering in computer graphics and computer vision. Topics include: appearance modeling, underwater imagery, vision in bad weather, and measurement techniques.

Instructors
Diego Gutierrez
Universidad de Zaragoza

Wojciech Jarosz
Disney Research Zürich

Craig Donner
Columbia University

Srinivasa Narasimhan
Carnegie Mellon University

Realistic Human Body Movement for Emotional Expressiveness

Friday, 7 August | 8:30 am - 12:15 pm
Level: Intermediate

Humans express their emotions in many ways, in particular through face, eye, and body motion. So creators of virtual humans strive to convincingly depict emotional movements using a variety of methods. This course focuses on the use of realistic human body motion to generate emotional expressiveness. Topics include: applications and research relating to procedural animation of humans with emotion and personality, biomechanical and physical principles of animation, physics-based human motion simulation, and data-driven animation. The course also provides some insights from the field of psychology and reviews issues relating to the perception and evaluation of realistic human body animation.

Instructors
Carol O'Sullivan
Trinity College Dublin

Ken Perlin
New York University

Aaron Hertzmann
University of Toronto

Interaction: Interfaces, Algorithms, and Applications

Friday, 7 August | 8:30 am - 12:15 pm
Level: Intermediate

The virtual reality field has recently seen the advent of novel commodity 3D user interfaces that have led to not only a revolution in video game interaction, but also new possibilities for other virtual reality applications. This course provides background on the interfaces and algorithms involved in 3D interaction, and previews the future of research in the field.

Instructors
Miguel A. Otaduy
Universidad Rey Juan Carlos

Takeo Igarashi
The University of Tokyo

Joseph J. LaViola, Jr.
University of Central Florida

Shape Grammars

Friday, 7 August | 8:30 am - 12:15 pm
Level: Intermediate

The theory of shape grammars, first launched by Stiny and Gips in 1972, defines a formalism to support the ambiguity in creative processes that is generally ruled out by quantitative and symbolic computations. Since then, it has evolved into a ground-breaking pragmatist philosophy of shape and design. It is implemented in fields rnaging from architecture to art, graphic design, industrial design, and computer visualization. This course offers basic knowledge of the theory of shape grammars and some advanced issues useful for its implementation.

The course is presented in two consecutive sessions. The introductory session presents the fundamentals of the theory, focusing on the basic knowledge of shapes, shape algebras, and shape rules in order to explain how shape grammars translate visual and spatial thinking into design computation. It includes several examples of shape grammar applications in design analysis and synthesis. Attendees with further and more technical interests in the topic are encouraged to continue with the advanced session, which dwells on the computational devices of shape grammars and discusses a number of selected studies on computational implementation of the shape grammar idea.

Instructors
Mine Özkar
Middle East Technical University

George Stiny
Massachusetts Institute of Technology

Computation & Cultural Heritage: Fundamentals and Applications

Friday, 7 August | 1:45 - 5:30 pm
Level: Intermediate

This course surveys several practical techniques advanced by graphics and vision researchers for applications in cultural heritage, archeology, and art history. Topics include: efficient techniques for digital capture of heritage objects, appropriate uses in the heritage field, an end-to-end pipeline for processing archeological reconstructions (with special attention to incorporating archeological data and review throughout the process), how digital techniques are actually used in cultural heritage projects, and an honest evaluation of progress and challenges in this field.

Instructors
Kevin Cain
Todd Gill
INSIGHT

Greg Downing
XRez Studio

Philippe Martinez
INSIGHT, MAFTO

Mark Eakle
Xenexus

Paul Debevec
Institute for Creative Technologies, University of Southern California

Benedict J. Brown
Katholieke Universiteit Leuven

Greg Ward
Dolby Canada

Paolo Cignoni
ISTI - CNR

Visual Algorithms in Post-Production

Friday, 7 August | 1:45 - 5:30 pm
Level: Intermediate

The work of the visual algorithms community (for example the work of SIGGRAPH Technical Papers authors) frequently affects real-world film post production. But often academics in the relevant fields have little idea of the tools and algorithms actually involved in day-to-day post production. This course surveys a range of typical tools and algorithmic techniques currently used in post production and shows how some emerging technologies may change these techniques in the future. The course attempts to demystify some of the processes and jargon involved, both to enlighten an academic audience and inspire new contributions to the industry.

Instructors
Simon Robinson
The Foundry

Anil Kokaram
Trinity College Dublin

Mike Seymour
fxguide, LLC

Advanced Material Appearance Modeling

Friday, 7 August | 1:45 - 5:30 pm
Level: Advanced

For many years, appearance models in computer graphics focused on general models for reflectance functions coupled with texture maps. Recently, it has been recognized that even very common materials such as hair, skin, fabric, and rusting metal require more sophisticated models to appear realistic. This course begins with a brief review of basic reflectance models and the use of texture maps. It describes common approaches in advanced material models such as combining the effects of layers, groups of particles, and/or fibers. It surveys the detailed models needed for a wide range of materials such as plants, hair, skin, plants, inks, gems, and automotive paints, and summarizes modeling of complex appearance due to aging and weathering processes.

Instructors
Holly Rushmeier
Julie Dorsey
Yale University

GAME PAPERS

The latest breakthroughs in game design, development, and research.

Supporting Social and Persuasive Play

Tuesday, 4 August | 8:30 - 10:15 am

Session Chair
Karen Schrier
Columbia University

Designing History: The Path to Participation Nation

A detailed project postmortem describing the iterative design process of a cross-media learning environment for high school students, the heart of which is an online collectible card game centered on US Constitutional issues.

Tracy Fullerton
University of Southern California,
School of Cinematic Arts

Laird Malamed
Activision Blizzard, Inc.

Nahil Sharkasi
Jesse Vigil
University of Southern California,
School of Cinematic Arts

Societal Impact of a Serious Game on Raising Public Awareness: The Case of FloodSim

FloodSim was developed with the aim of raising awareness of issues surrounding flooding policy and citizen engagement in the UK. This paper presents the results of analyzing the game's impact and its efficacy in raising public awareness among large numbers of players.

Genaro Rebolledo-Mendez
The Serious Games Institute

Katerina Avremides
University of Sussex

Sara de Freitas
The Serious Games Institute

Kam Memarzia
PlayGen Ltd.

Using Influence and Persuasion to Shape Player Experiences

The results of a pilot study indicating the effectiveness of using social-psychological influences to guide players' decisions in a choose-your-own-adventure-style online story.

David Roberts
Merrick Furst
Charles Isbell
Brian Dorn
Georgia Institute of Technology

Game Design Strategies for Collectivist Persuasion

This paper presents design considerations associated with developing a serious game about smoking cessation targeted at collectivist players and based on collectivist persuasive game-design strategies, and then summarizes a quantitative evaluation of effects on individualist and collectivist players.

Rilla Khaled
Pippin Barr
Robert Biddle
Carleton University

James Noble
Ronald Fischer
Victoria University of Wellington

Game Mechanics and Design Projects

Tuesday, 4 August | 3:45 - 5:30 pm

Session Chair
Tracy Fullerton
University of Southern California,
School of Cinematic Arts

Game Design Principles for Engaging Cooperative Play: Core Mechanics and Interfaces for Non-Mimetic Simulation of Fire Emergency Response

Work practice serves as the basis for non-mimetic simulation of fire emergency response. Non-mimetic simulation focuses on information flows and distributed cognition. This simulation, a game to teach team coordination, takes form through core mechanics and interface components. A series of experiments distills game design principles for engaging cooperative play.

Zachary Toups
Andruid Kerne
William Hamilton
Texas A&M University

Experimental Evaluation of Teaching Recursion in a Video Game

This novel game, EleMental: The Recurrence, provides computer science students the opportunity to write code and perform interactive visualization to effectively learn about recursion through depth-first search of a binary tree.

Amanda Chaffin
Katelyn Doran
Drew Hicks
Tiffany Barnes
University of North Carolina at Charlotte

Game Mechanics and Design Projects *continued*

Cardboard Semiotics: Reconfigurable Symbols as a Means for Narrative Prototyping in Game Design

This paper adapts a participatory design method known as cardboard computing to the domain of game design by suggesting a method for combining semiotic analysis with cardboard prototyping to improve both high-level and interactive storytelling in video games.

Rudy McDaniel
University of Central Florida

Erik Henry Vick
Stephen Jacobs
Rochester Institute of Technology

Peter Telep
University of Central Florida

Game Design for Social Networks

This talk explores design drivers for creating games for social-networking platforms, such as Facebook and Twitter, and introduces a number of both theoretical and practical principles to inspire game concept creation and design solutions.

Aki Järvinen
T-Universitetet i København

Kinesthetic Movement in Games I

Wednesday, 5 August | 8:30 - 10:15 am

Session Chair
Tracy Fullerton
University of Southern California,
School of Cinematic Arts

A High-Performance Visual Profiler for Games

A fast visual-performance profiler that enables game developers to efficiently and effectively find causes of frame drops and other bottlenecks in video games.

Michiel Roza
Mark Schroders
Eximion B.V.

Huub van de Wetering
Technische Universiteit Eindhoven

Presence-Enhancing Real Walking User Interface for First-Person Video Games

For first-person video games, players must have a high-level of feeling presence in the game environment. This paper describes user interfaces based on real walking and virtual portals for presence-enhancing gameplay, and introduces transitional environments as a starting point for the virtual reality gaming experience.

Frank Steinicke
Gerd Bruder
Klaus Hinrichs
Universität Münster

Anthony Steed
University College London

Understanding Visual Interfaces for the Next Generation of Dance-Based Rhythm Video Games

A study comparing three different visual methods for displaying dance-routine information in RealDance, a next-generation dancing videogame prototype. RealDance uses four Nintendo Wiimotes, attached to the player's arms and legs, providing a 3D spatial interface for more natural gameplay.

Emiko Charbonneau
Chadwick Wingrave
Andrew Miller
Joseph LaViola Jr.
University of Central Florida

Rock Band: A Case Study in the Design of Embodied Interface Experience

With the recent surge of interest in novel game interface devices, there is a need for new theoretical tools for critiquing and designing embodied game interactions. This paper presents a preliminary framework for the study of embodied interface using a case study of Rock Band to illustrate its utility.

Joshua Tanenbaum
Jim Bizzocchi
Simon Fraser University

Kinesthetic Movement in Games II

Thursday, 6 August | 1:45 - 3:30 pm

Session Chair
Karen Schrier
Columbia University

Art of Defense: A Collaborative, Handheld Augmented-Reality Board Game

This game uses camera phones as windows onto merged physical and digital spaces, leveraging physical game pieces to combine the social and physical aspects of board games with the continuous simulation of a computer game.

Duy-Nguyen Ta Huynh
Karthik Raveendran
Yan Xu
Kimberly Spreen
Blair MacIntyre
Georgia Institute of Technology

A Framework for Exertion Interactions Over a Distance

This paper introduces a framework to analyze existing and design novel exertion games for social play, demonstrated with Remote Impact, a full-body shadowboxing game for distributed players that facilitates extreme physical exertion.

Florian Mueller
Stefan Agamanolis
Frank Vetere
Martin R. Gibbs
The University of Melbourne

A Unified Approach for Physically Based Simulations and Haptic Rendering

A novel geometric data structure, inner sphere trees, that supports both approximate proximity queries and penetration volume with one unified algorithm. This enables computation of continuous forces and torques between rigid objects consisting of hundreds of thousands of polygons for physically based simulations or force-feedback at haptic rates.

Rene Weller
Gabriel Zachmann
Technische Universität Clausthal

Giving Yourself to the Game: Transferring a Player's Own Movements to Avatars Using Tangible Interfaces

Projecting own-movement onto abstracted self-representations and visual avatars by combining common coding approaches with tangible interfaces and virtual worlds.

Ali Mazalek
Georgia Institute of Technology

Sanjay Chandrasekharan
University of Calgary

Michael Nitsche
Georgia Institute of Technology

Tim Welsh
University of Calgary

Geoff Thomas
Tandav Sanka
Paul Clifton
Georgia Institute of Technology

3D and the Cinematic in Games

Thursday, 6 August | 3:45 - 5:30 pm

Session Chair
Drew Davidson
Carnegie Mellon University

Inferred Lighting: Fast Dynamic Lighting and Shadows for Opaque and Translucent Objects

Inferred lighting is a three-stage rendering pipeline that uses a special discontinuity-sensitive filter to "infer" lighting values from a lower-resolution lighting buffer, enabling a very large number of lights, a unified lighting and shadowing pipeline for alpha and opaque polygons, and hardware multisample antialiasing.

Scott Kircher
Alan Lawrance
Volition, Inc.

Interactive Simulation of Flying Japanese Kites

A real-time kite-flying simulation system using experimental data for the flying kite, a lift and drag force calculation method based on aerodynamics, real-time fluid simulation, and tensile-force calculation based on a mass-spring model.

Taichi Okamoto
Shizuoka University

Makoto Fujisawa
Nara Institute of Science and Technology

Kenjiro Miura
Shizuoka University

3D and the Cinematic in Games
continued

The Bespoke 3DUI XNA Framework: A Low-Cost Platform for Prototyping 3D Spatial Interfaces in Video Games

An open-source software platform for research in 3D user interaction. The system leverages low-cost, widely available game technologies and provides 3D user-interface machinery in a game-development framework.

Paul Varcholik
Joseph LaViola
Charles Hughes
University of Central Florida

Heuristics for Continuity Editing of Cinematic Computer-Graphics Scenes

Heuristics for editing footage of 3D computer-graphics cinematic sequences into a coherent movie clip that obeys the conventions of continuity editing, following specified stylistic rules.

Kaveh Kardan
Henri Casanova
University of Hawaii

MUSIC PERFORMANCES

Performances that combine music with imagery or demonstrate novel interactive techniques.

See What You Feel: A Study FESTIVAL
in the Visual Extension of Music

Monday, 3 August | 6 - 8 pm

A live performance of abstract animations of music pre-rendered in Maya, 3D visualizations of music-theory structures, and real-time systems that visually react to live music. The SIGGRAPH 2009 talk titled A Study in the Visual Extension of Music discusses the music system used in this performance.

Matthew Bain
The Ohio State University

Pandeiro Funk: Experiments on Rhythm-Based Interaction

Tuesday, 4 August | 6 - 8 pm

This work addresses the problem of making the machine listen and react to the musician to generate high-quality music in an improvisation situation. The method uses rhythmic phrases as commands to control the computer instead of using pedals or other interfaces, so the musician can enter or leave an interaction mode just by playing a certain rhythmic phrase.

The advantages of this approach are many. It is based in real-life experience. The musician can concentrate only on the music and not on control interfaces. It lets the musician control the machine without stopping the music flow. It requires low computational cost and gives fast results. Because it is audio-based, it can be applied to many sorts of instruments. And because a rhythmic phrase carries information that can be used as parameters during the interaction, the commands carry more information, and the interaction becomes richer and more natural.

In this performance, the system is adapted to work with a Brazilian percussion instrument called Pandeiro. Includes a brief discussion of this performance.

Sergio Krakowski
Luiz Velho
Instituto Nacional de Matemática Pura e Aplicada

François Pachet
Sony Computer Science Laboratory Paris

envyCODE

Wednesday, 5 August | 1:45 - 3:30 pm

envyCODE is Butch Rovan on custom instruments, extended alto clarinet (MiMICS System), and interactive electronics; Kevin Patton on extended guitar (Taurex System), custom instruments, and interactive electronics; and Carmen Montoya on custom instruments and interactive electronics.

FrameGarden (2009)
FrameGarden is a structured improvisation loosely inspired by the formal arrangement of a karesan-sui, or Japanese dry rock garden. The piece features hybrid/extended alto clarinet and guitar, custom instruments, and interactive computer music. The alto clarinet and guitar incorporate onboard sensor systems that allow each instrumentalist to control real-time processing as part of their normal performance gestures. Custom instruments include The Globe and The Banshee, new instruments designed by Rovan, and The Digital Poplar Consort, a set of four new sensor instruments designed by Patton and Montoya.

All sources – extended alto clarinet, extended guitar, and new instruments – control real-time processing in MaxMSP and STEIM's LiSa. Includes a brief discussion of this performance.

Joseph Rovan
Kevin Patton
Maria Del Carmen Montoya
Brown University

Improvisation With The TOOB

Wednesday, 5 August | 1:45 - 3:30 pm

The TOOB is a unique wireless electronic instrument created to extend wind-instrument performance techniques into the electroacoustic realm. It has been tweaked for over two years to give the performer a vast but intuitive range of sonic choices, allowing creative freedom in solo or group improvisation. The instrument senses breath, finger pressure, tilt, and acceleration, and has several other tactile controls. Sound is created and processed using Max/MSP/Jitter.

Arvid Tomayko-Peters
Squish the Squid Productions

Sergi Jorda on reactable

Wednesday, 5 August | 6 - 8 pm

The Reactable is based on a translucent and luminous round table. By putting tangible pucks on the Reactable surface, turning them, and connecting them to each other, performers can combine different elements such as synthesizers, effects, sample loops, or control elements to create a unique and flexible composition. Reactable's pucks represent the building blocks of electronic music. Each one has a different function in sound generation or effect processing, in a method deeply inspired by modular analog synthesizers such as those developed by Bob Moog in the early 1960s. Includes a brief discussion of this performance.

Sergi Jorda
Günter Geiger
Marcos Alonso
Martin Kaltenbrunner
Reactable Systems

Silent Drum

Thursday, 6 August | 1:45 - 3:30 pm

The Silent Drum is a transparent drum shell with an elastic head. When it is pressed, the membrane adapts to the shape of the hand. The shapes are captured by a video camera and sent to a computer, which analyzes them and outputs the tracked parameters. By mapping these parameters, the physical movements of the performer are translated into sound. The controller itself is completely silent when played.

The silent drum produces a large amount of variables only if the input is complex. Its design is based on a simple, effective hierarchical logic: there are no fingers without a hand, no hand without an arm, no arm without a body. It reports continuous variables and extracts discrete variables. Sound events, bounded by discrete variables, are used for score control, triggers, mapping changes, etc. Continuous variables are used to shape sound morphologies.

Jaime Oliver
University of California, San Diego

And Then, Romina ...

Thursday, 6 August | 6 - 8 pm

And Then, Romina..., for prepared electric guitar and electronics, is a dramatic work that explores various relationships between live guitar and electronic sound. Among these relationships is a concern for using electronics to extend both the timbral and performance possibilities of the live instrument. Much of the piece is abstractly based on the Italian song "O surdato nammurato" (Califano/Canino, 1915), which can be heard most distinctly at the end. The piece was composed at City University, London in the fall and winter of 2000.

Mike Frengel
Northeastern University

Full Conference Access registration allows attendees access to all SIGGRAPH 2009 Panels. Seating is on a first-come, first-served basis. Please be sure to arrive early for the Panel you wish to attend.

PANELS

Panels have long been an important part of the annual SIGGRAPH conference, providing a forum for the community to share experiences, opinions, insights, speculation, disagreement, controversy, and audience interaction with the leading experts in computer graphics and interactive techniques.

Partial list of Panels:

Getting a Job in CG for Entertainment: Visual Effects, Animation, and Games

FESTIVAL

Monday, 3 August | 1:45 - 3:30 pm

Recruiters from Digital Domain, The Motion Picture Company, and Sony Pictures Imageworks discuss what it takes to get a job in CG from the ground up.

Keeping a Job in CG for Entertainment: Visual Effects, Animation, and Games

FESTIVAL

Monday, 3 August | 3:45 - 5:30 pm

Supervisors from the industry's big three CG entertainment fields discuss what it takes to keep your skills up to date in the ever-changing CGI industry.

The State of Aesthetic Computing or Info-Aesthetics

Monday, 3 August | 3:45 - 5:30 pm

Aesthetic Computing is one of several related new fields: Info-Aesthetics, Database Aesthetics, Network Aesthetics, and Software Aesthetics. What are their similarities and differences? What are the aesthetic issues that drive them? How are they linked to technological developments? And what exactly is the role of aesthetics is this context?

Michael Kelly
University of North Carolina at Charlotte

Victoria Vesna
University of California, Los Angeles

Paul Fishwick
University of Florida

Andrew Vande Moere
University of Sydney

Kenneth Huff
Savannah College of Art and Design

Building Digital Cities

FESTIVAL

Tuesday, 4 August, | 9:30 - 10:15 am

Experts in the use of current 3D tools discuss their use in current urban planning, sustainability, and reconstruction.

Moderator
Doug Eberhard
Autodesk, Inc.

Panelists
Kevin Gilson
Parsons Brinckerhoff

Donald Newlands
Newlands & Company, Inc.

The Visual in New Interfaces for Musical Expression

Tuesday, 4 August | 10:30 am - 12:15 pm

We are constantly creating new ways to generate and organize sound. Sometimes the result is plain fun, and sometimes it's just really nice to listen to. This panel brings together experts who have tried to create new interfaces for musical expression through very different technical means. Using tabletop interfaces, visual-sound installations, mobile music making, and circuit bending, the panelists explore what the visual means in these different approaches to musical art.

Moderator
Georg Essl
University of Michigan

Panelists
Joseph Paradiso
Massachusetts Institute of Technology

Sergi Jorda
Pompeu Fabra University of Barcelona

The Future of Teaching Computer Graphics for Students in Engineering, Science, and Mathematics

Wednesday, 5 August | 8:30 - 10:15 am

In response to recent advances in graphics hardware and ensuing changes in application programming interfaces, this panel discusses various approaches to teaching a first course in computer graphics to technically oriented students.

Edward Angel
University of New Mexico

Peter Shirley
Evan Hart
NVIDIA Corporation

Dave Shreiner
ARM Ltd.

Instigating Change: Models for Positive Games

Wednesday, 5 August | 1:45 - 3:30 pm

What kinds of games have positive social impacts? Recent developments in independent game making show that positive changes in games do perhaps make changes in the real world. Games that entertain and also have unique, positive social aspects can empower forms of critical play and encourage people to take positive action. What are these games, what are the motivations of the game makers, and what's happening? Our panel of national leaders in the field will showcase examples such as Hurricane Katrina: Tempest in Crescent City, LAYOFF, ORGY, Hush, and Akoha.

Panelists
Mary Flanagan
Dartmouth College

Alan Gershenfeld
E-Line Ventures

Jay Bachhuber
Global Kids, Inc.

Alex Eberts
Akoha

Tracy Fullerton
University of Southern California

The Art History of Games

Thursday, 6 August | 8:30 - 10:15 am

This panel explores ideas surrounding games as an art form, the role of technology in the development of game and the relationship among games, the established art world, "fine art" forms, and the cultural traditions of art.

John Sharp
Savannah College of Art and Design

Ian Bogost
Georgia Institute of Technology

Frank Lantz
Area/Code

Michael Nitsche
Georgia Institute of Technology

Peter Weishar
Savannah College of Art and Design

BioLogic and Generative Fabrication

Thursday, 6 August | 10:30 am - 12:15 pm

Computer-based technologies initially performed an assistive role, as tools that enhanced existing practices in functionalist ways. However, according to Tanya Harrod (The Applied Arts and the Politics and Poetics of Digital Technology, 2002, http://www.pixelraiders.org/), the claim that the computer is only a tool is a cliché. She states that the computer is not just a tool and that use of computer-based technologies affects the thought processes of practitioners.

This panel discussion is an opportunity to hear a selection of practitioners participating in the BioLogic and Generative Fabrication exhibitions talk about how they have employed computation beyond an assistive role in their work and discuss how technology has influenced their approach to creative practice.

Moderator
John Marshall
rootoftwo, University of Michigan

Panelists
Arthur Elsenaar
Artifacial.org, Nottingham Trent University

Chris Lasch
Aranda/Lasch

Jenny Sabin
CabinStudio+, Sabin+Jones LabStudio, University of Pennsylvania

Yoon Chung Han
Mohoya.com, University of California, Los Angeles

Simulated Physics in Games

Thursday, 6 August | 10:30 am - 12:15 pm

This panel brings together academic and industry experts to discuss current issues and future challenges related to using realistic physics simulations in computer games and other interactive applications.

James O'Brien
University of California, Berkeley

Eric Parker
Pixelux Entertainment S.A.

Jay Stelly
Valve Corporation

Doug James
Cornell University

Zoran Popović
University of Washington

David Wu
Microsoft Corporation

Dilip Sequeira
NVDIA Corporation

Short-Cuts to Reality: The Art and Compromise of Software Development for Physics-Based VFX

Thursday, 6 August | 3:45 - 5:30 pm

An exploration of the art and compromise of software development for physics-based VFX with special emphasis on issues related to technology transfer from academia.

Ken Museth
Digital Domain

Ron Henderson
DreamWorks Animation

Nick Rasmussen
Industrial Light & Magic

Jerry Tessendorf
Rhythm & Hues Studios

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

PRODUCTION SESSIONS

The Computer Animation Festival presents insider updates on the production secrets behind recent feature films.

Building Benjamin Button: A Blending of "Technique-ologies"

Monday, 3 August | 8:30 - 10:15 am

How existing and new approaches were used to create a photo-real digital character with a true-to-life performance, followed by a panel on using digital processes as storytelling tools in collaboration with cameras, lights, and lenses.

Eric Barba
Steven Preeg
Digital Domain

Edson Williams
Lola Visual Effects

Robots, Cyborgs, and the Final Frontier: An Inside Look at "Transformers: Revenge of the Fallen", "Terminator Salvation", and "Star Trek"

Tuesday, 4 August | 1:45 - 5 pm

Industrial Light & Magic sheds light on the visual effects in the next chapter of the Transformers series and looks at the latest installments of two legendary franchises.

Terminator:
Marc Chu
Philippe Rebours
Industrial Light & Magic

Star Trek:
Roger Guyett
Hilmar Koch
John Goodson
Industrial Light & Magic

Transformers 2:
Jeff White
Scott Benza
Jason Smith
Industrial Light & Magic

Big, Fast and Cool: Making the Art for Fight Night 4 & Gears of War 2

Wednesday, 5 August | 10:30 am - 12:15 pm

With the arrival of high-def game consoles, super-realistic graphics with immersive CG environments, characters, and VFX are no longer the exclusive territory of film. This session looks at how the art of Fight Night 4 and Gears of War have exploded the boundaries of what's possible in real time.

Moderator
Evan Hirsch

Wyeth Johnson
Epic Games

Panelists
Jenny Freeman
Frank Vitz
Electronic Arts, Canada

Making of "Cloudy With a Chance of Meatballs" in Stereo and Mono

Wednesday, 5 August | 1:45 - 3:30 pm

The production team discusses and demonstrates the creative and technological elements that helped them achieve the most delicious event since macaroni met cheese.

Rob Bredow
Rob Engle
Sony Pictures Imageworks

The Mass Animation Project and the Future of Crowd-Sourced Creativity

Thursday, 6 August | 10:30 am - 12:15 pm

The Mass Animation Project leveraged the global support team of Facebook, new technologies, and the cross-cultural appeal of music to access the talents of the international animation community.

Yair Landau
Mass Animation Project

John Cooney
Intel Corporation

Jacquie Barnbrook
Live Nation

Melanie Ball
Autodesk, Inc.

Monsters vs. Stereo: How Stereo Affected Production on "Monsters vs. Aliens"

Thursday, 6 August | 10:30 am - 12:15 pm

This session tracks the impact of stereo from concept to delivery on the production of "Monsters vs. Aliens", the first animated feature for which stereo was integrated into the primary filmmaking process.

Moderator
Darin Grant
PDI/DreamWorks

Panelists
Ken Bielenberg
Mahesh Ramasubramanian
Phil Captain 3D McNally
Gary Lee
PDI/DreamWorks

G-Force 3D: Guinea Pigs, Gadgets and the Stereoscopic Post-Production Workflow

Thursday, 6 August | 1:45 - 3:30 pm

The journey of this traditionally shot hybrid CG and live action film from flat elements to dimensional experience used a variety of visual effects techniques and created a breakthrough workflow for stereoscopic film production.

"Coraline": The Changing Face of Animation

Thursday, 6 August | 3:45 - 5:30 pm

An overview of how 3D printing technology was used to change the way stop-motion animation was used in the creation of the characters in "Coraline".

Brian McLean
LAIKA, Inc.

Neil Ranney
Objet Geometries Inc.

Full Conference Access registration allows attendees access to all SIGGRAPH 2009 Talks. Seating is on a first-come, first-served basis. Please be sure to arrive early for the Talk sessions you wish to attend.

TALKS

SIGGRAPH 2009 Talks provide a broad spectrum of presentations on recent achievements in all areas of computer graphics and interactive techniques, including art, design, animation, visual effects, interactive music, research, interactivity, and engineering.

Partial list of Talks:

Information and Aesthetics: Designing Interactions

Monday, 3 August | 8:30 - 10:15 am

Session Chair
Nicole Coleman
Stanford University

well-formed.eigenfactor: Considerations in Design and Data Analysis

This talk discusses the rationale, process, and mechanisms behind the interactive visualizations for the well-formed.eigenfactor project.

Moritz Stefaner
Fachhochschule Potsdam

Martin Rosvall
Carl Bergstrom
University of Washington, Seattle

Synchronous Objects for One Flat Thing, Reproduced

Synchronous Objects is an interactive screen-based work that illuminates, reinterprets, and transforms the choreographic structures in William Forsythe's dance One Flat Thing, reproduced through a vivid collection of information objects designed by a team of multidisciplinary researchers at The Ohio State University.

Maria Palazzi
Norah Zuniga Shaw
The Ohio State University

GreenLite Dartmouth: Unplug or the Polar Bear Gets It

GreenLite Dartmouth visualizes complex, real-time energy data using interactive animations to create an emotional relationship between energy use and its effects. When electricity use is low, for example, a polar bear is happy and playful. As more energy is used, the bear becomes distressed, and his well-being is endangered.

Evan Tice
Tim Tregubov
Kate Schnippering
Yoon-Ki Park
Ray diCiaccio
Max Friedman
Jennifer Huang
Justin Slick
Giulia Siccardo
Jessica Glago
Stephanie Trudeau
Daniel Gobaud
Daniel Garcia
Craig Slagel
Lorie Loeb
Dartmouth College

Visual Music **FESTIVAL**

Monday, 3 August | 1:15 - 5:30 pm

Session Chair
Dennis Miller
Northeastern University

From Pythagoras to Pixels: The Ongoing Trajectory of Visual Music

A historical overview of visual music from early analog creations to current digital creations.

Pam Turner
Virginia Commonwealth University

Designing Instruments for Abstract Visual Improvisation

This talk explores objectives in the visual-music domain and how we can make color, form, and motion accessible to visual improvisers.

Fred Callopy
Case Western Reserve University

Modulated Feedback: The Audio-Visual Composition "Mercurius"

Discussion of the nature and use of custom sonic and visual algorithms in the award-winning audio-visual composition "Mercurius".

Bret Battey
De Montfort University

Talks | Monday, 3 August

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Animation Festival Pass

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SIGGRAPH2009 Advance Program

Visual Music *continued* FESTIVAL

Visual Music and the True Collaboration of Art Forms and Artists

Discussion of the structural design, textural patterns, and expressive gestures of the multimedia genre commonly known as "collaborative image/music composition".

Stephanie Maxwell
Rochester Institute of Technology

What Sound Does Color Make?

Using mathematical models to create visual compositions and designs.

Brian Evans
University of Alabama

Exploring Shifting Ground: Creative Intersections Between Experimental Animation and Audio

Approaches to creating productive relationships between audio and visuals by applying elements and principles across interdisciplinary lines.

Bonnie Mitchel
Elainie Lillios
Bowling Green State University

Splashing in Pipelines

Monday, 3 August | 1:45 - 3:30 pm

Session Chair
Andy Nealen
Rutgers University

Non-Reflective Boundary Condition For Incompressible Free-Surface Fluids

A novel non-reflective boundary condition for free-surface water simulation.

Andreas Söderström
Linköpings universitet

Ken Museth
Digital Domain

An Efficient Level Set Toolkit for Visual Effects

An efficient level set toolkit for VFX based on a novel compact data structure, DB-Grid.

Ken Museth
Digital Domain

Water-Surface Animation for "Madagascar: Escape 2 Africa"

A system for animating water surfaces using the shallow-water and linear-wave equations along with appropriate discretizations. The system is fast, robust, and well-behaved with respect to changes in grid resolution, allowing quick artistic iterations and independent control over the look of different scales of motion.

Ron Henderson
DreamWorks Animation

Jason Waltman
PDI/DreamWorks

Underground Cave Sequence for "Land of the Lost"

For "Land of the Lost", Rhythm & Hues was tasked to create the underwater Mystery Cave sequence, which involved creating a photorealistic underground river, a collapsing cave, a waterfall, and a dimensional vortex.

Lucio Flores
David Horsley
Rhythm & Hues Studios

See What You Feel: A Study FESTIVAL in the Visual Extension of Music

Monday, 3 August | 6 - 8 pm

A live performance of abstract animations of music pre-rendered in Maya, 3D visualizations of music-theory structures, and real-time systems that visually react to live music. The SIGGRAPH 2009 talk titled A Study in the Visual Extension of Music discusses the music system used in this performance.

Matthew Bain
The Ohio State University

Making It Move

Monday, 3 August | 3:45 - 5:30 pm

Session Chair
Paul Kry
McGill University

Geometric Fracture Modeling in "Bolt"

A system to facilitate modeling of elaborate crack-ing and shattering objects. The system supports automatic generation of a large number of frag-ments, artist control of the density and complexity of cracks, and manual fine-tuning of the shape of the resulting pieces.

Jeffrey Hellrung
University of California, Los Angeles

Andrew Selle
Arthur Shek
Walt Disney Animation Studios

Eftychios Sifakis
Joseph Teran
University of California, Los Angeles
Walt Disney Animation Studios

Simulating the Balloon Canopy in "Up"

The sheer number of dynamic bodies in the balloon canopy in "Up" required a reimagining of Pixar's rigid-body simulation environment and development of concise rigs and exible artists' tools.

Jon Reisch
Eric Froemling
Pixar Animation Studios

Art and Interaction

Tuesday, 4 August | 8:30 - 10:15 am

Session Chair
Joyce Rudinsky
University of North Carolina at Chapel Hill

Applying Color Theory to Creating Scientific Visualizations

The process of building effective color maps for producing explanatory and aesthetically engaging scientific visualizations.

Theresa-Marie Rhyne
North Carolina State University

GPSFilm: Location-Based Mobile Cinema

An open-source application that enables a new way of watching a movie based on the viewer's location and journey.

Scott Hessels
Nanyang Technological University

Karma Chameleon: Jacquard-Woven Photonic Fiber Display

Karma Chameleon is a photonic textile display woven on a Jacquard loom, using photonic band-gap fibers that can change color when illuminated with ambient or transmitted light. Using double-weave structures allows further modulation of the color and patterns in the textile.

Joanna Berzowska
Concordia University

Maksim Skorobogatiy
École Polytechnique de Montréal

Tuesday, 4 August | 8:30 - 10:15 am

Generalizing Multi-Touch Direct Manipulation

A screen-space-based approach for direct manipulation on multi-touch surfaces, which both completely captures the behaviors of existing 2D direct manipulators and naturally extends direct manipulation into three dimensions.

Jason Reisman
Philip Davidson
Jefferson Han
Perceptive Pixel, Inc.

BiDi Screen

A BiDirectional (BiDi) screen capable of both imaging and display that uses an LCD as a spatial-light modulator to support seamless tran-sition from on-screen, multi-touch interactions to off-screen, hover-based gestures.

Matthew Hirsch
Massachusetts Institute of Technology

Douglas Lanman
Brown University

Ramesh Raskar
Henry Holtzman
Massachusetts Institute of Technology

Education: Learning and the Studio

Tuesday, 4 August | 8:30 - 10:15 am

Session Chair
Dana Masson
Animation Mentor and Killerjellybean Animation

Innovation in Animation: Exiting the Comfort Zone

Motivating fine arts students to move beyond replication and explore the many possibilities available for making interesting animated images is achieved by engaging students in a careful examination of the defining elements of animation, early innovations, and the ongoing spirit of discovery.

Pamela Taylor
Virginia Commonwealth University

Educate the Educator: Lessons Learned From the Faculty Education Programs at Rhythm & Hues Studios Worldwide

This talk provides pointers on how to benefit from faculty-outreach programs based on lessons learned from faculty education programs conducted by Rhythm & Hues Studios at locations in the US and India.

Shish Aikat
Rhythm & Hues Studios

Bringing the Studio to Campus: A Case Study in Successful Collaboration Between Academia and Industry

This talk describes the organization and results from an 11-week graduate-level course administered by Texas A&M University and DreamWorks Animation in which 15 students and six industry professionals took part in a client-service model project to produce three 30-second animated shorts.

Jill Mulholland
Texas A&M University

Jim Conrads
Marilyn Friedman
Dave Walvoord
DreamWorks Animation

Jose Guinea Montalvo
Texas A&M University

Building Bridges, Not Falling Through Cracks: What We Have Learned During 10 Years of Australian Digital Visual Effects Traineeships

The digital-visual-effects industry is one of the most successful examples of industry building in an increasingly digital world. This case study looks at the interconnectedness of education, employment, infrastructure, and innovation, and presents a framework of the qualities and processes that have been key to the industry's success.

Shilo McClean
NICTA

Taking Care of Your Pet

Tuesday, 4 August | 6:15 - 8 pm

Session Chair
Caleb Howard
Electronic Arts

Hatching an Imaginary Bird

Extensions to traditional modeling, articulation, grooming, and shading developed to fulfill the design requirements for Kevin, the giant, iridescent, flightless bird in Pixar's film, "Up".

Byron Bashforth
Tom Sanocki
Junyi Ling
Laura Hainke
Pixar Animation Studios

Rhino-Palooza: Procedural Animation and Mesh Smoothing

The set of novel tools and techniques developed to solve the technical challenges of Rhino, the hamster from Disney's "Bolt".

Dmitriy Pinskiy
Evan Goldberg
Walt Disney Animation Studios

It's Good to be Alpha

The geometric, rigging, grooming, and shading challenges of creating the highly stylized canine character of Alpha for "Up".

Robert Moyer
Paul Aichele
Laura Hainke
Byron Bashforth
Pixar Animation Studios

Venomous Cattle for "Australia"

Summary of the crowd workflow based on Rising Sun Pictures' Venom 3D infrastructure that was developed to arrange, simulate, reuse, and render animated cattle for numerous shots in Baz Luhrmann's "Australia".

Carsten Kolve
Dan Bethell
Rising Sun Pictures

Painterly Lighting

Wednesday, 5 August | 8:30 - 10:15 am

Session Chair
Diego Guttierez
Zaragoza University

Applying Painterly Concepts in a CG Film

For "Bolt", a tool set was developed to achieve techniques used by painters, such as massing, editing, and edge-quality, which helped to achieve the textural richness of the classic Disney animated films.

Adolph Lusinsky
Walt Disney Animation

Painting With Polygons

An exploration of a simple but effective non-photorealistic rendering solution that uses existing polygonal rendering tools including normal displacement, motion blur, and basic gradient shaders.

Isaac Botkin
First Pacific Media

Smoother Subsurface Scattering

A technique for smoothing the sampling noise in the subsurface scattering model employed by the proprietary production renderer at Rhythm & Hues, which saves substantial time and memory.

Ivan Neulander
Rhythm & Hues Studios

Radially Symmetric Reflection Maps

A technique for rendering hand-painted, radially symmetric area lights at real-time rates, using a new representation based on prefiltered reflection maps.

Jonathan Stone
Double Fine Productions

Two Bolts and a Button

Wednesday, 5 August | 1:45 - 3:30 pm

Session Chair
Evan Hirsch

The Light Kit: HDRI-Based Area Light System for "The Curious Case of Benjamin Button"

A photorealistic lighting system based on HDRI-mapped area lights developed at Digital Domain for "The Curious Case of Benjamin Button".

Tadao Mihashi
Dan Abrams
Paul Lambert
Marco Maldonado
Jesse James Chisholm
Digital Domain

Interactive Lighting of Effects Using Point Clouds In "Bolt"

A technique for using point clouds to illuminate effects and the environments they interact developed for Disney's animated feature film "Bolt" to enhance effects integration.

Dale Mayeda
Walt Disney Animation Studios

Composite-Based Refraction for Fur and Other Complex Objects on "Bolt"

A compositing-based solution to the problem of rendering and artdirecting refracted hair and fur, developed for Disney's animated feature film "Bolt".

Lewis Siegel
Sean Jenkins
Walt Disney Animation Studios

Capture and Display

Wednesday, 5 August | 1:45 - 3:30 pm

Session Chair
Ariel Shamir
The Interdisciplinary Center

Dense Stereo Event Capture for the James Bond Film "Quantum of Solace"

A multi-view geometry-reconstruction system developed to capture the performance of Daniel Craig and Olga Kurylenko free falling in a vertical wind tunnel for the latest James Bond movie, "Quantum of Solace".

Oliver James
Ted Waine
Double Negative Visual Effects

2D and 3D Facial Correspondences via Photometric Alignment

Computing optical flow on scans of facial expressions (albedo and photometric normals) to establish correspondences that can be used to parameterize high-resolution 3D geometry in a common 2D UV domain, enabling blends of facial expression geometries in a temporally coherent yet detail-preserving manner.

Cyrus Wilson
Abhijeet Ghosh
Pieter Peers
Jen-Yuan Chiang
Jay Busch
Paul Debevec
University of Southern California,
Institute for Creative Technologies

Capture and Display *continued*

ILM's Multitrack: A New Visual Tracking Framework for High-End VFX Production

An example-based visual tracking algorithm designed to handle a variety of challenging VFX production scenarios.

Christoph Bregler
Kiran Bhat
Jeff Saltzman
Brett Allen
Industrial Light & Magic

Estimating Specular Roughness From Polarized Second-Order Spherical Gradient Illumination

This method estimates per-pixel specular roughness using polarized second-order spherical gradient illumination and shows that, for isotropic BRDFs, only three second-order spherical gradient patterns are sufficient for a robust estimate of per-pixel specular roughness.

Abhijeet Ghosh
Tongbo Chen
Pieter Peers
Cyrus Wilson
Paul Debevec
Institute for Creative Technologies,
University of Southern California

Explorations in Art and Design

Wednesday, 5 August | 3:45 - 5:30 pm

Session Chair
Daria Tsoupikova
University of Illinois at Chicago

Computational Thinking Through Programming and Algorithmic Art

Using algorithmic art to develop computational thinking skills through computer programming. Also an art-programming algorithm taxonomy that identifies a broad range of algorithms and their links to specific design elements and principles as well as specific programming and mathematical concepts.

Genevieve Orr
Willamette University

Universal Panoramas: Narrative, Interactive Panoramic Universes on the Internet

Universal Panoramas is an idea and an emerging toolset for creating narrative interactive universes on the internet by combining panoramic photography and computer graphics, sound, live-action video, and animation into coherent, immersive wholes for use in interactive entertainment, architecture visualization, and corporate presentations.

Kim Larsen
Placebo Effects AS

Genetic Stair

The Genetic Stair is an exploration of the expressive potential of biologically inspired generative design techniques and contemporary fabrication technologies.

Nicholas Desbiens
Caliper Studio

Immersive and Impressive: The Impressionistic Look of Flower on the PS3 **FESTIVAL**

Wednesday, 5 August | 3:45 – 5:30 pm

Flower is a PlayStation 3 downloadable game and winner of numerous industry best-graphics awards. Hear how the tiny team at thatgamecompany created immersive and realistic natural environments by focusing on impressionistic rendering rather than photorealism.

John Edwards
thatgamecompany

See, Hear, Make, and Play

Wednesday, 5 August | 3:45 - 5:30 pm

Session Chair
Wendy Ju
Stanford University

The Blues Machine

A multitouch, tangible guitar-like interface for 12-bar blues improvisation.

Marcelo Cicconet
Ilana Paterman
Paulo Cezar Carvalho
Luiz Velho
Instituto Nacional de Matemática Pura e Aplicada

Computer-Mediated Performance and Extended Instrument Design

This talk explores some of the ways that technology can be used to enable or redefine improvisational musical-performance practice.

Thomas Ciufo
Smith College

InTune: A Musician's Intonation Visualization System

A computer system that allows a musician to visualize the intonation exhibited in a performance. The system presents three intuitive and linked views: an annotated music score, a pitch trace, and a spectrogram.

Kyung Ae Lim
Christopher Raphael
Indiana University

Building Story in Games: No Cut Scenes Required **FESTIVAL**

Thursday, 6 August | 10:30 am – 12:15 pm

Telling stories through objectives and rewards is unique to our art form. How can we connect some of the tenets of traditional storytelling, including character arcs and three-act structures into a medium that demands emergent storytelling? This session covers a variety of different fiction-delivery techniques for interactive entertainment.

Danny Bilson
THQ Inc.

Bob Nicoll
Electronic Arts

Effects Omelette

Thursday, 6 August | 10:30 am - 12:15 pm

Session Chair
Jim Hillin
Digital Domain

Concurrent Monoscopic and Stereo-scopic Animated Film Production

An examination of the creative choices, techniques, and production pipeline for Disney's "Bolt", which generate an approach to concurrent production of both monoscopic and stereoscopic versions of a CG-animated feature film.

Robert Neuman
Walt Disney Animation Studios

Pushing Tailoring Techniques To Reinforce "Up" Character Design

This talk outlines the tailoring team's use of traditional pattern-making techniques to create garments that reinforced the character design of the extremely caricatured characters in Pixar Animation Studio's "Up".

Fran Kalal
Carmen Ngai
Claudia Chung
Pixar Animation Studios

The Net Effect: Simulated Bird-Catching in "Up"

An explanation of techniques and technology used to create a highly interactive weighted net ensnaring a character in "Up".

Eric Froemling
Pixar Animation Studios

Destroying the Eiffel Tower: A Modular FX Pipeline

The destruction of this complex model, involving terabytes of data per shot, was only possible through the use of a Python-based modular pipeline that was almost completely procedural.

Daniel P. Ferreira
Daniel Maskit
Atsushi Ikarashi
Digital Domain

Music as Multi Sense

Thursday, 6 August | 3:45 - 5:30 pm

Session Chair
Wendy Ju
Stanford University

The Immersive Computer-Controlled Audio Sound Theater: History and Current Trends in Multi-Modal Sound Diffusion

The Immersive Computer-Controlled Audio Sound Theater is a large-scale loudspeaker array for concert presentation of electro-acoustic music. It uses a client-server architecture, with traditional and novel control interfaces, to provide real-time control of audio diffusion over an array of up to 44 loudspeakers.

Stephen Beck
Louisiana State University

Multi-Touch Everywhere!

A portable device that enables users to turn any flat surface into a multi-touch controller for music and other media applications.

Alain Crevoisier
Greg Kellum
University of Applied Sciences Western Switzerland

Sound Scope Headphones

Sound Scope Headphones are designed to let users control an audio mixer through natural movements and enable a musical novice to separately listen to each player's performance.

Sound Scope Headphones demo in Emerging Technologies ⇢⇢

Masatoshi Hamanaka
SeungHee Lee
University of Tsukuba

Rendering

Friday, 7 August | 8:30 - 10:15 am

Session Chair
Bob Crocco
Microsoft Live Labs

Practical Uses of a Ray Tracer for "Cloudy With a Chance of Meatballs"

How the physically based nature of raytracing was combined with an artistically flexible toolset to achieve the complex, but stylized look of "Cloudy With a Chance of Meatballs" while providing the artist an interactive lighting environment.

Karl Herbst
Danny Dimian
Sony Pictures Imageworks

Multi-Layer, Dual-Resolution Screen-Space Ambient Occlusion

This talk describes a general method for rendering higher-quality screen space ambient occlusion (SSAO) by using depth-peeled layers and an enlarged frustum, as well as a dual-resolution method for improving the performance of any SSAO algorithm.

Louis Bavoil
Miguel Sainz
NVIDIA Corporation

RACBVHs: Random-Accessible, Compressed Bounding-Volume Hierarchies

A novel approach to compressed bounding-volume hierarhcies that supports random access and achieves 12:1 compression ratio and 4:1 run-time performance for ray tracing and collision detection.

Tae-Joon Kim
Sung-eui Yoon
Korea Advanced Institute of Science and Technology

Rendering Volumes With Microvoxels

This robust volumetric rendering extension to the REYES rendering architecture includes support for decoupled shading, fast motion blur, and accurate compositing.

Andrew Clinton
Mark Elendt
Side Effects Software

Doing It With Game Engines

Friday, 7 August | 8:30 - 10:15 am

Session Chair
Naty Hoffman
Activision

How to Get From 30 to 60 Frames Per Second in Video Games for "Free"

A novel technique for video games that combines the best of high-quality rendering at 30 frames per second with the natural motion of objects refreshing at 60 frames per second with very minimal memory and performance overhead.

Dmitry Andreev
LucasArts

Making a Feature-Length Animated Movie With a Game Engine

Delacave has recently completed "The True Story of Puss'n Boots" using real-time hardware technologies. This talk illustrates the challenges, difficulties, and new possibilities that real-time gaming technologies can offer to production of a computer-animated movie.

Alexis Casas
Pierre Augeard
Ali Hamdan
Delacave

Wildfire Forecasting Using an Open-Source 3D Multilayer Geographical Framework

A wildfire forecasting system with realistic 3D visualization for coordination and management of emergency situations. The system allows visualization of the wildfire in a realistic landscape and estimation of its evolution in various vegetation and weather conditions. It also allows visualization of and interaction with different types of emergency units.

Modesto Castrillón
Pedro A. Jorge
Universidad de Las Palmas de Gran Canaria

Ignacio J. López
Instituto Tecnológico de Canarias

David Martín
Universidad de Las Palmas de Gran Canaria

Rafael J. Nebot
Izzat Sabbagh
Instituto Tecnológico de Canarias

Javier Sánchez
Antonio J. Sánchez
José P. Suárez
Agustín Trujillo
Universidad de Las Palmas de Gran Canaria

Real Fast Rendering

Friday, 7 August | 10:30 am - 12:15 pm

Session Chair
Dan Wexler
NVIDIA Corporation

Volumetric Shadow Mapping

A new, adaptive method for fast rendering of volumetric shadows in dusty, foggy, or underwater environments. Rendering quality can be adjusted for applications ranging from real-time application to production rendering.

Pascal Gautron
Jean-Eudes Marvie
Thomson Corporate Research

Guillaume Francois
The Moving Picture Company

Bucket Depth Peeling

An efficient algorithm for multi-layer depth peeling, which captures and sorts multiple fragments in a single geometry pass via a bucket sort on GPU. The algorithm outperforms previous methods in both quality and speed, especially for large-scale scenes with high depth complexity.

Fang Liu
Meng-Cheng Huang
Xue-Hui Liu
Chinese Academy of Sciences

En-Hua Wu
Chinese Academy of Sciences, Universidade de Macau

BVH for Efficient Raytracing of Dynamic Metaballs on GPU

A new method for efficiently raytracing a large number of metaballs using dynamic BVH and current graphics hardware capacities. This technique allows interactive real-time rendering of complex and deformable geometries of arbitrary topology including effects such as shadows and mirror reflections.

Olivier Gourmel
Anthony Pajot
Université Toulouse

Pierre Poulin
Université de Montréal

Mathias Paulin
Loïc Barthe
Université Toulouse

Normal Mapping With Low-Frequency Precomputed Visibility

Encoding visibility using low-order spherical harmonics and evaluating the triple product integral of lighting, visibility, and the cosine term on the GPU decouples normal variation from visibility. Combined with PCA compression and efficient factorization of the triple product, soft shadows can be computed more efficiently.

Michal Iwanicki
CD Projekt RED

Peter-Pike Sloan
Disney Interactive Studios

Character Animation and Rigging

Friday, 7 August | 3:45 - 5:30 pm

Session Chair
Bobby Boddenheimer
Vanderbilt University

Animation and Simulation of Octopus Arms in "Night at the Museum 2"

A set of techniques used to animate flexible arms for the monstrous octopus character in "Night at the Museum 2".

Tae-Yong Kim
Matt Derksen
Rhythm & Hues Studios

Methods for Fast Skeleton Sketching

Introducing different methods and concepts for defining a fast and effective sketching interface for skeleton creation, including stroke embedding methods and a full-featured templating system.

Martin Poirier
Eric Paquette
École de technologie supérieure

Practical Character Physics For Animators

A graphics system that significantly improves the visual quality of certain types of 3D character motion animated with traditional means by inferring physical properties and correcting the results through the use of dynamics.

Ari Shapiro
Rhythm & Hues Studios

Sung-Hee Lee
University of California, Los Angeles

Surface Motion Graphs for Character Animation From 3D Video

A framework for character animation production that reuses captured 3D video sequences of people according to user constraints on movement, position, and timing The system has the potential to create realistic, synthetic, animated content by reproducing the dynamics of shape and appearance currently missing from marker-based motion capture.

Peng Huang
Adrian Hilton
University of Surrey

Full Conference Access registration allows attendees access to all SIGGRAPH 2009 Technical Papers. Seating is on a first-come, first-served basis. Please be sure to arrive early for the Technical Papers sessions you wish to attend.

■ ● ▲

SPECIAL EVENT
Technical Papers Fast-Forward

Monday, 3 August | 6 - 8 pm

The world's leading experts in computer graphics and interactive techniques preview their latest work in provocative, sometimes hilarious summaries of the field's evolution.

TECHNICAL PAPERS

The SIGGRAPH Technical Papers program is the premier international forum for disseminating new scholarly work in computer graphics. These papers span the areas of modeling, animation, rendering, and imaging, but they also touch on related areas such as visualization, computer vision, human-computer interaction, and applications of computer graphics. The Technical Papers are published in the *ACM Transactions on Graphics* (TOG). The conference presentations also includes papers from all issues of TOG.

To promote a lively exchange of ideas during the Technical Papers program, attendees are invited to submit questions to the discussant of each session.

COMPLETE DETAILS ON THE DISCUSSANT SYSTEM, AND HOW YOU CAN SUBMIT QUESTIONS. →→

Atta texana leafcutting ant colony: a view underground © 2007 Texas A&M University

Fast Image Processing and Retargeting

Tuesday, 4 August | 8:30 - 10:15 am

Session Chair
Aaron Hertzmann
University of Toronto
Submit a Question →

Gaussian KD-Trees for Fast High-Dimensional Filtering

This paper proposes the Gaussian KD-Tree: A high-dimensional data structure to accelerate a broad class of non-linear filters, including bilateral, non-local means, and a novel non-local means for geometry.

Andrew Adams
Stanford University

Natasha Gelfand
Nokia Research

Jennifer Dolson
Marc Levoy
Stanford University

Edge-Avoiding Wavelets and Their Applications

This paper proposes a new family of second-generation wavelets, constructed using a robust data-prediction lifting scheme. The support of these new wavelets avoids having pixels from both sides of an edge, thus lowering the inter-scale correlation. This new framework allows performing edge-preserving processing in linear time.

Raanan Fattal
Hebrew University

Multi-Operator Media Retargeting

A method to combine different operators to retarget media in an optimal manner. A new image similarity measure, called Bi-Directional Warping (BDW), is used with dynamic programming to find an optimal path in a multi-dimensional resizing space. Results are shown on images as well as video.

Michael Rubinstein
Ariel Shamir
The Interdisciplinary Center

Shai Avidan
Adobe Systems Incorporated

PatchMatch: A Randomized Correspondence Algorithm for Structural Image Editing

A fast randomized algorithm for computing approximate nearest-neighbor fields in images. The algorithm supports a variety of tools appropriate for interactive image editing, including image completion, retargeting, and reshuffling. The paper provides theoretical analysis of the algorithm and demonstrates its use in a working interactive image editor.

Connelly Barnes
Princeton University

Eli Shechtman
Adobe Systems Incorporated

Adam Finkelstein
Princeton University

Dan Goldman
Adobe Systems Incorporated

Curve and Surface Modeling (TOG)

Tuesday, 4 August | 8:30 - 10:15 am

Session Chair
Cindy Grimm
Washington University in St. Louis
Submit a Question →

2D Piecewise Algebraic Splines for Implicit Modeling

This paper introduces a technique to construct bivariate spline-basis functions from any given set of 2D polygons. In addition to their obvious use in designing free-form parametric geometric shapes, the proposed 2D splines have been shown to be a powerful tool for implicit shape modeling.

Qingde Li
University of Hull

Jie Tan
The Chinese Academy of Sciences

A BSP-Based Algorithm for Dimensionally Nonhomogeneous Planar Implicit Curves With Topological Guarantees

This algorithm renders 2D implicit curves with self-intersections and isolated points. Its core is a modified two-point numerical method capable of sampling not only sign-variant curve components that satisfy the Bolzano corollary, but also sign-invariant and mixed components that are usually missed by other algorithms.

Abel Gomes
Jose F. Morgado
Edgar S. Pereira
Universidade da Beira Interior

Curve and Surface Modeling (TOG) *continued*

Tuesday, 4 August | 8:30 - 10:15 am

Interpolatory Point Set Surfaces: Convexity and Hermite Data

Point set surfaces are extended to interpolate given points and normals with good shape quality and additional parameters for shape control.

Marc Alexa
Technische Universität Berlin

Anders Adamson
Sinora

A Variational Approach for Automatic Generation of Panoramic Maps

Panoramic maps are commonplace navigation aids in tourist places like ski resorts or national parks. Traditionally, an artist skillfully designs such maps by combining several views into a single image. This paper presents an automatic approach that rearranges landscape features to avoid their occlusion and ensure good visibility with minimal deformations.

Patrick Degener
Reinhard Klein
Universität Bonn

Perception and Depiction

Tuesday, 4 August | 10:30 am - 12:15 pm

Session Chair
Kavita Bala
Cornell University
Submit a Question →

Light Warping for Enhanced Surface Depiction

Starting from a 3D object with an arbitrary material and environment illumination, this approach enhances surface depiction by locally compressing or stretching reflected light patterns. Such a process allows users to re-introduce or attenuate features such as convexities and concavities, or foreshortened regions, in arbitrary lighting and viewing directions.

Romain Vergne
Romain Pacanowski
Pascal Barla
Xavier Granier
Christophe Schlick
INRIA Bordeaux University

Toward Evaluating Lighting Design Interface Paradigms for Novice Users

A user study focusing on novices to evaluate the benefits of three lighting-design interface paradigms: direct manipulation, indirect feature dragging, and optimization through painting. This study will affect design of future lighting interfaces and additional experiments toward a comprehensive evaluation of lighting interfaces.

William Kerr
Fabio Pellacini
Dartmouth College

Modeling Human Color Perception Under Extended Luminance Levels

Human color perception has not yet been studied for very high luminances. The authors have gathered unique psychophysical data for luminance levels covering most of the dynamic range of the human visual system and derived a generalized color appearance model that quantifies human color perception for this extended range.

Min H. Kim
Tim Weyrich
Jan Kautz
University College London

How Well Do Line Drawings Depict Shape?

The ability of line drawings to depict 3D shape was studied by asking participants to estimate surface normals at many points. The results show that line drawings can depict certain shapes as well as shaded renderings, and that errors in depiction are localized and can often be traced to particular lines.

Forrester Cole
Princeton University

Kevin Sanik
Doug DeCarlo
Rutgers University

Adam Finkelstein
Thomas Funkhouser
Princeton University

Szymon Rusinkiewicz
Princeton University and Adobe Systems, Incorporated

Manish Singh
Rutgers University

Light and Materials

Tuesday, 4 August | 1:45 - 3:30 pm

Session Chair
Pedro Sander
The Hong Kong University of Science and Technology
Submit a Question ⇒

Kernel Nystrom Method for Light Transport

The Kernel Nystrom method for reconstructing the light transport matrix from a relatively small number of acquired images is highly effective for scenes with complex lighting effects such as caustic, shadowing, inter-reflection, and subsurface scattering.

Jiaping Wang
Microsoft Research Asia

Yue Dong
Tsinghua University and Microsoft Research Asia

Xin Tong
Zhouchen Lin
Microsoft Research Asia

Baining Guo
Microsoft Research Asia and Tsinghua University

An Empirical BSSRDF Model

A new explicit representation of the homogeneous BSSRDF based on large-scale simulations. This model captures the appearance of materials that are not accurately represented using existing single-scattering models or multiple isotropic-scattering models (for example, the diffusion approximation).

Craig Donner
Columbia University

Jason Lawrence
University of Virginia

Ravi Ramamoorthi
University of California, Berkeley

Toshiya Hachisuka
Henrik Wann Jensen
University of California, San Diego

Shree Nayar
Columbia University

SubEdit: A Representation for Editing Measured Heterogeneous Subsurface Scattering

A novel representation for editing measured heterogeneous subsurface scattering. It makes artistic modifications efficient and at the same time ensures good visual quality.

Ying Song
ZheJiang University

Xin Tong
Microsoft Research Asia

Fabio Pellacini
Dartmouth College

Pieter Peers
University of Southern California,
Institute for Creative Technologies

Fabricating Microgeometry for Custom Surface Reflectance

Manufacturing physical surfaces that, in aggregate, exhibit a desired surface appearance. From a user specification of a BRDF, or simply a highlight shape, this method infers the required distribution of surface slopes. It optimizes for a manufacturable height field with this slope distribution and fabricates it using a computer-controlled mill.

Tim Weyrich
University College London

Pieter Peers
University of Southern California,
Institute for Creative Technologies

Wojciech Matusik
Adobe Systems, Incorporated

Szymon Rusinkiewicz
Princeton University and Adobe Systems, Incorporated

Shape Editing and Deformation

Tuesday, 4 August | 1:45 - 3:30 pm

Session Chair
Mario Botsch
Universität Bielefeld
Submit a Question ⇒

iWires: An Analyze-and-Edit Approach to Shape Manipulation

The essence of man-made objects can often be captured in a small set of 1D curves or wires. This paper demonstrates that extracting such wires, learning their individual properties and mutual relations, and subsequently preserving them during editing, leads to a simple, efficient, and powerful shape editing framework.

Ran Gal
Tel-Aviv University

Olga Sorkine
New York University

Niloy Mitra
Indian Institute of Technology

Daniel Cohen-Or
Tel-Aviv University

Variational Harmonic Maps for Space Deformation

The paper presents a space deformation method that combines the advantages of cage-based methods (smoothness, efficiency, robustness, and ease of implementation) with the ease of use of constraint-based methods. The deformation is based on generating an As-Rigid-As-Possible harmonic map of the source domain, which best fits the user's constraints.

Mirela Ben-Chen
Ofir Weber
Craig Gotsman
Technion - Israel Institute of Technology

Shape Editing and Deformation
continued

Joint-Aware Manipulation of Deformable Models

Complex mesh models of man-made objects often consist of multiple components connected by various types of joints. This paper proposes a joint-aware deformation framework that supports direct manipulation of an arbitrary mix of rigid and deformable components, and respects various joint constraints connecting them.

Weiwei Xu
Microsoft Research Asia

Jun Wang
University of Science and Technology of China

KangKang Yin
Microsoft Research Asia

Kun Zhou
Zheijang University

Michiel van de Panne
The University of Biritish Columbia

Falai Chen
University of Science and Technology of China

Baining Guo
Microsoft Research Asia

Semantic Deformation Transfer

Given a few example pose pairs, semantic deformation transfer infers a meaningful corre-spondence between two meshes and synthesizes novel poses of one mesh from the input poses of the other. For example, it can transfer the poses of a person walking normally to poses of walking on two hands.

Ilya Baran
Daniel Vlasic
Massachusetts Institute of Technology

Eitan Grinspun
Columbia University

Jovan Popović
Adobe Systems, Incorporated, University of Washington, and Massachusetts Institute of Technology

Fluid Simulation

Tuesday, 4 August | 3:45 - 6 pm

Session Chair
Robert Bridson
The University of British Columbia
Submit a Question ➡➡

Harmonic Fluids

An algorithm for synthesizing familiar bubble-based fluid sounds such as splashing, pouring, and babbling. The algorithm acoustically aug-ments existing incompressible fluid solvers with particle-based models for acoustic bubble cre-ation, vibration, advection, and radiation. Acoustic transfer functions are estimated using our fast dual-domain boundary integral Helmholtz solver.

Changxi Zheng
Doug James
Cornell University

Energy-Preserving Integrators for Fluid Animation

This paper proposes simple, unconditionally stable, fully Eulerian integration schemes that accurately capture the monotonic energy decay induced by viscosity, hence maintaining liveliness of low-viscosity fluids without recourse to correc-tive devices.

Patrick Mullen
Keenan Crane
Dmitry Pavlov
California Institute of Technology

Yiying Tong
Michigan State University

Mathieu Desbrun
California Institute of Technology

Modular Bases for Fluid Dynamics

This paper presents fluid tiles, modular reduced models that can be assembled into huge simula-tions. Consistency between tiles is enforced using constraint reduction, which modifies reduced models to ensure compatibility between tiles. The coupling terms can be precomputed, allowing for interactive rearrangement of the tiles while the simulation is running.

Martin Wicke
Stanford University

Matt Stanton
Adrien Treuille
Carnegie Mellon University

Predictive-Corrective Incompressible SPH

This paper presents a novel SPH solver that enforces incompressibility by using a prediction-correction scheme to determine the particle pressures. Results show that the method clearly outperforms the commonly used weakly com-pressible SPH model by more than an order of magnitude.

Barbara Solenthaler
Renato Pajarola
University of Zurich

Directable, High-Resolution Simulation of FIre on the GPU

A hybrid particle and grid simulation system that utilizes graphics hardware (GPU) to quickly simulate artist-directable, high-resolution fire. Simulation resolutions as high as 2048 can be computed in a few hours by parallelizing work among multiple GPUs.

Christopher Horvath
Willi Geiger
Industrial Light & Magic

Image Warping and Interpolation

Wednesday, 5 August | 8:30 - 10:15 am

Session Chair
Victor Ostromoukhov
Université de Montréal
Submit a Question →

Moving Gradients: A Path-Based Method for Plausible Image Interpolation

A method for plausible interpolation of images based on the intuitive idea that a given pixel in the interpolated frames traces out a path in source images. It has several key aspects, such as arbitrary transition points between images, simple and efficient occlusion handling, and working in the gradient domain.

Dhruv Mahajan
Columbia University

Fu-Chung Huang
University of California, Berkeley

Wojciech Matusik
Adobe Systems, Incorporated

Ravi Ramamoorthi
Peter Belhumeur
Columbia University

Optimizing Content-Preserving Projections for Wide-Angle Images

Any projection of a three-dimensional scene into a two-dimensional image inherently produces some type of distortion. This paper presents a method for creating a projection adapted to the contents of a particular scene, minimizing the perceived distortion of the image.

Robert Carroll
Maneesh Agrawala
University of California, Berkeley

Aseem Agarwala
Adobe Systems, Incorporated

Content-Preserving Warps for 3D Video Stabilization

A technique that transforms a video from a hand-held video camera so that it appears as if it were taken with a directed camera motion. This method adjusts the video to appear as if it were taken from nearby viewpoints, enabling simulation of 3D camera movements.

Feng Liu
Michael Gleicher
University of Wisconsin-Madison

Hailin Jin
Aseem Agarwala
Adobe Systems, Incorporated

FlexiStickers - Photogrammetric Texture Mapping Using Casual Images

A novel approach for texturing 3D models using casual images, which manages to account for the 3D geometry of the photographed object. The algorithm is realized in a FlexiStickers application, which enables fast interactive texture mapping using a small number of constraints.

Yochay Tzur
Ayellet Tal
Technion - Israel Institute of Technology

Motion Synthesis and Editing (TOG)

Wednesday, 5 August | 8:30 - 10:15 am

Session Chair
Carol O'Sullivan
Trinity College Dublin
Submit a Question →

Generalizing Motion Edits With Gaussian Processes

One way that artists create compelling character animations is by manipulating details of a character's motion. This process is expensive and repetitive. This paper shows that we can make such motion editing more efficient by generalizing the edits an animator makes on short sequences of motion to other sequences.

Leslie Ikemoto
Animate Me

Okan Arikan
University of Texas, Austin

David Forsyth
University of Illinois at Urbana-Champaign

Optimization-Based Interactive Motion Synthesis

A physics-based approach to synthesizing motion of a responsive virtual character in a dynamically varying environment. This framework allows the programmer to specify active control strategies using intuitive kinematic goals that are encoded as objectives and constraints in the optimization problem formulated at each time step.

Sumit Jain
Yuting Ye
C. Karen Liu
Georgia Institute of Technology

Lie Group Integrators for Animation and Control of Vehicles

A general framework for integrating the dynamics of holonomic and nonholonomic vehicles (helicopters, boats, and cars), resulting in integration schemes that are superior to standard methods in numerical robustness and efficiency.

Marin Kobilarov
Keenan Crane
Mathieu Desbrun
California Institute of Technology

Surfaces

Wednesday, 5 August | 10:30 am - 12:15 pm

Session Chair
Misha Kazhdan
The John Hopkins University
Submit a Question ➡

NURBS With Extraordinary Points: High-Degree, Non-Uniform, Rational Subdivision Schemes

This paper introduces arbitrary topology surfaces with all the capabilities of NURBS. Previous subdivision surfaces have always been either uniform, low degree, or both. In contrast, this scheme can represent any odd-degree NURBS patch. The surfaces can also include extraordinary points, which extends NURBS to arbitrary topologies.

Thomas J. Cashman
Ursula H. Augsdörfer
Neil A. Dodgson
University of Cambridge

Malcolm A. Sabin
Numerical Geometry Ltd

Direct Trimming of NURBS Surfaces on the GPU

A highly efficient direct-trimming technique for NURBS surfaces, based on a novel point-classification scheme for curved regions including holes. This approach is applicable to tessellation-based rendering as well as to ray tracing systems.

Andre Schollmeyer
Bernd Fröhlich
Bauhaus-Universität Weimar

Bi-3 C^2 Polar Subdivision

C^2 polar subdivision uses small, simple, local rules to refine a polar control net compatibly with Catmull-Clark subdivision. The resulting surfaces are C^2, piecewise of degree bi-3, allow for high valences, and can model the full complement of quadratic shapes.

Ashish Myles
Jörg Peters
University of Florida

Symmetric Tiling of Closed Surfaces: Visualization of Regular Maps

Cut out F polygons with p sides from an elastic fabric, sew them together such that at each corner q polygons meet, stuff tightly. What shape could you get? This puzzle has a scope that ranges from mathematical physics via art to baby toys, and we provide visual answers.

Jarke J. van Wijk
Technische Universiteit Eindhoven

Reduced Physics for Animation

Wednesday, 5 August | 1:45 - 3:30 pm

Session Chair
Adrien Treuille
Carnegie Mellon University
Submit a Question ➡

Enrichment Textures for Detailed Cutting of Shells

A method for simulating highly detailed cutting and fracturing of thin shells at a resolution much finer than the underlying simulation mesh. The harmonic-enrichment textures handle multiple, intersecting, arbitrarily shaped, and progressive cuts in a simple and unified framework.

Peter Kaufmann
Sebastian Martin
ETH Zürich

Mario Botsch
Universität Bielefeld

Eitan Grinspun
Columbia University

Markus Gross
ETH Zürich

Numerical Coarsening of Inhomogeneous Elastic Materials

A methodology to approximate a deformable object made of arbitrary fine structures of various linear elastic materials with a dynamically similar coarse model.

Lily Kharevych
Patrick Mullen
Houman Owhadi
Mathieu Desbrun
California Institute of Technology

Preserving Topology and Elasticity for Embedded Deformable Models

This paper introduces a new approach for embedding linear elastic deformable models. The technique results in significant improvements in the efficient, physically based simulation of highly detailed objects.

Matthieu Nesme
McGill University, Grenoble Universités, INRIA, LJK-CNRS

Paul Kry
McGill University

Lenka Jeřábková
INRIA, LJK-CNRS

François Faure
Grenoble Universités, INRIA, LJK-CNRS

Deformable Object Animation Using Reduced Optimal Control

Our method can generate a physically plausible motion of a large deformable model that matches a given set of keyframes. It does so by properly applying model reduction to the control problem, decreasing space-time optimization times from many hours to just a few minutes.

Jernej Barbič
Marco da Silva
Massachusetts Institute of Technology

Jovan Popović
Adobe Systems, Incorporated, University of Washington, and Massachusetts Institute of Technology

Creating Natural Variations

Wednesday, 5 August | 3:45 - 6 pm

Session Chair
Sylvain Paris
Adobe Systems, Incorporated
Submit a Question →→

Procedural Noise Using Sparse Gabor Convolution

A procedural noise function that offers accurate spectral control and setup-free surface noise with high-quality anisotropic filtering.

Ares Lagae
Katholieke Universiteit Leuven

Sylvain Lefebvre
George Drettakis
REVES/INRIA Sophia-Antipolis

Philip Dutré
Katholieke Universiteit Leuven

Eye-Catching Crowds: Saliency-Based Selective Variation

This paper shows that crowd variety can be efficiently achieved by varying only the heads and upper bodies of characters, as these were found to be most salient. The authors evaluated the effectiveness and performance implications of varying these parts using different accessories, textures, and geometry alterations.

Rachel McDonnell
Micheal Larkin
Trinity College Dublin

Benjamín Hernández Arreguín
Isaac Rudomín
Instituto Tecnológico y de
Estudios Superiores de Monterrey

Carol O'Sullivan
Trinity College Dublin

Example-Based Hair Geometry Synthesis

This paper presents an example-based approach to hair geometry modeling.

Lvdi Wang
Tsinghua University

Yizhou Yu
University of Illinois at Urbana-Champaign

Kun Zhou
Zhejiang University

Baining Guo
Microsoft Research Asia

Visio-lization: Generating Novel Facial Images

This paper aims to learn a model of facial images and use this to generate new examples. The results do not resemble the training faces, but are realistic and incorporate variation in sex, age, pose, illumination, hairstyle and other factors. We also adapt this method to edit real facial images.

Umar Mohammed
Simon Prince
Jan Kautz
University College London

Self-Organizing Tree Models for Image Synthesis

This paper presents a method for generating realistic models of temperate-climate trees based on the competition of buds and branches for light or space, regulated by internal signaling mechanisms. The method is illustrated with tree models, forest scenes, animations of tree development, and examples of combined interactive-procedural tree modeling.

Wojciech Pałubicki
Kipp Horel
Steven Longay
Adam Runions
Brendan Lane
University of Calgary

Radomír Měch
Adobe Systems, Incorporated

Przemyslaw Prusinkiewicz
University of Calgary

Imaging and Rendering Pipeline (TOG)

Wednesday, 5 August | 3:45 - 5:30 pm

Session Chair
Hanspeter Pfister
Harvard University
Submit a Question →→

Fourier Depth-of-Field

This paper introduces an analysis of focusing and depth of field in the frequency domain, allowing a practical characterization of a light field's frequency content. Based on this analysis, the paper proposes an adaptive depth-of-field rendering algorithm that optimizes both image and aperture sampling.

Cyril Soler
Kartic Subr
INRIA Rhône-Alpes

Frédo Durand
CSAIL, Massachusetts Institute of Technology

Nicolas Holzschuch
François Sillion
INRIA, Université Joseph Fourier-Grenoble, CNRS

Compressive Light Transport Sensing

Reflectance fields for image-based relighting using compressive sensing, several innovations that address problem-specific challenges (for example, a novel hierarchical decoding algorithm that exploits inter-pixel coherency relations), and a new set of illumination patterns that improves signal-to-noise in the measurements.

Pieter Peers
University of Southern California,
Institute for Creative Technologies

Dhruv K. Mahajan
Columbia University

Bruce Lamond
Abhjeet Ghosh
University of Southern California,
Institute for Creative Technologies

Wojciech Matusik
Adobe Systems, Incorporated

Ravi Ramamoorthi
University of California, Berkeley

Paul Debevec
University of Southern California,
Institute for Creative Technologies

Imaging and Rendering Pipeline (TOG) *continued*

Display Supersampling

In conventional supersampling, multiple scene samples are computationally combined to produce a single screen pixel. In display super-sampling, multiple display samples are physically combined via superimposition of display pixels. This paper analyzes the requirements for producing high-quality alias-free textures on such displays.

Niranjan Damera-Venkata
Nelson L. Chang
HP Labs

GRAMPS: A Programming Model for Graphics Pipelines

A programming model that generalizes modern graphics pipelines. Applications are structured as graphs of stages that exchange data via queues. GRAMPS is demonstrated with three applications (Direct3D, a ray tracer, and a combination) on two simulated platforms: GPU-like and CPU-like multi-core machines.

Jeremy Sugerman
Stanford University

Kayvon Fatahalian
Solomon Boulos
Stanford University

Kurt Akeley
Microsoft Research

Pat Hanrahan
Stanford University

Character Animation I

Thursday, 6 August | 8:30 - 10:15 am

Session Chair
Jehee Lee
Seoul National University
Submit a Question ⇒

Dextrous Manipulation From a Grasping Pose

This paper describes an automatic algorithm that takes as input an initial grasping pose and partial object trajectory, and produces as output a physically plausible hand animation that effects the desired manipulation.

C. Karen Liu
Georgia Institute of Technology

Optimal Gait and Form for Animal Locomotion

A fully automatic method for generating gaits and morphologies for legged-animal locomotion. This approach requires only a description of an animal's basic shape as input and can determine a plausible motion and gait type as well as refine the animal's shape.

Kevin Wampler
Zoran Popović
University ot Washington

Performance-Based Control Interface for Character Animation

A system that directly uses human motion perfor-mance to provide a radically different, and much more expressive interface for controlling virtual characters.

Satoru Ishigaki
Timothy White
Georgia Institute of Technology

Victor Zordan
University of California, Riverside

C. Karen Liu
Georgia Institute of Technology

Detail-Preserving Continuum Simulation of Straight Hair

This paper presents a hybrid Eulerian/Lagrangian approach to efficiently handling both self and body collisions with hair while still maintaining detail. Bulk interactions and hair-volume preserva-tion are handled efficiently and effectively with a FLIP-based fluid solver, while intricate hair-hair interaction is handled with Lagrangian self-collisions.

Aleka McAdams
University of California, Los Angeles

Andrew Selle
Kelly Ward
Walt Disney Animation Studios

Eftychios Sifakis
Joseph Teran
University of California, Los Angeles

Rendering Methods and Systems (TOG)

Thursday, 6 August | 8:30 - 10:15 am

Session Chair
Julie Dorsey
Yale University
Submit a Question →→

Affine Double and Triple Product Wavelet Integrals for Rendering

This paper introduces a new theory of affine wavelet integrals that enables relighting with near-field planar area lights at real-time rates. The theory also has applications in importance sampling and image processing.

Bo Sun
Columbia University

Ravi Ramamoorthi
University of California, Berkeley

Participating-Media Illumination Using Light-Propagation Maps

A new method for propagating light through participating media that inherits the generality and computational lightness of the Discrete Ordinates Method while avoiding its two main shortcomings: false scattering and ray effects.

Raanan Fattal
Hebrew University

A Tool to Create Illuminant and Reflectance Spectra for Light-Driven Graphics and Visualization

There is more to a picture than you can see. To enable designers to make effective use of spectral lighting to steer overall tone of a scene or to make metameric detail visible, this method creates a palette of spectral lights and materials for graphics and visualization.

Steven Bergner
Mark S. Drew
Torsten Möller
Simon Fraser University

Automatic Pre-Tessellation Culling

This paper introduces an algorithm for automatically computing tight bounds on the fly for a base primitive before tessellation. These bounds are derived from an arbitrary vertex-shader program, which may include curved-surface evaluations and displacements. The obtained bounds are used for backface, view frustum, and occlusion culling before tessellation.

Jon Hasselgren
Jacob Munkberg
Tomas Akenine-Möller
Lunds universitet, Intel Corporation

Interacting With Hands, Eyes, and Images

Thursday, 6 August | 10:30 am - 12:15 pm

Session Chair
Steve Feiner
Columbia University
Submit a Question →→

Real-Time Hand-Tracking With a Color Glove

This paper describes a tracking system that reconstructs the position, orientation, and pose of the hand from a single camera. The tracking is fast enough to allow interactive user input and to experiment with design of new interfaces for interaction and animation.

Robert Y. Wang
Massachusetts Institute of Technology

Jovan Popović
Adobe Systems, Incorporated, University of Washington, and Massachusetts Institute of Technology

Achieving Eye Contact in a One-to-Many 3D Video Teleconferencing System

A 3D teleconferencing system that achieves accurate gaze and eye contact between an autostereoscopically displayed remote participant and an audience of multiple observers. The system leverages live 3D face scanning, high-speed video projection, custom vertex shaders, and interactive face tracking to simulate both horizontal and vertical parallax.

Andrew Jones
Magnus Lang
Graham Fyffe
Xeuming Yu
Jay Busch
University of Southern California,
Institute for Creative Technologies

Ian McDowall
Fakespace Labs

Mark Bolas
University of Southern California, Institute for Creative Technologies & School of Cinematic Arts

Paul Debevec
University of Southern California,
Institute for Creative Technologies

The UnMousePad - An Interpolating Multi-Touch Force-Sensing Input Pad

The UnMousePad is a flexible and inexpensive multitouch input sensor based on a novel principle: interpolating force-senstive resistance. IFSR devices can acquire high-quality anti-aliased images of pressure over a surface at high frame rates. This paper describes operating principles, implementation details, device characteristics, and potential applications.

Ilya Rosenberg
Ken Perlin
New York University Media Research Lab

Generating Photo Manipulation Tutorials by Demonstration

A demonstration-based system for automatically generating visual step-by-step tutorials of photo manipulations. The tutorials illustrate the manipulation using images, text, and annotations. They leverage image recognition to add semantically meaningful information. The authors demonstrate the approach on portrait retouching and editing outdoor scenes.

Floraine Grabler
Maneesh Agrawala
University of California, Berkeley

Wilmot Li
Mira Dontcheva
Adobe Systems, Incorporated

Takeo Igarashi
The University of Tokyo, JST ERATO

Visual, Cut, Paste, and Search

Thursday, 6 August | 1:45 - 3:30 pm

Session Chair
Raanan Fattal
The Hebrew University of Jerusalem
Submit a Question ➜➜

Coordinates for Instant Image Cloning

Poisson cloning made interactive: a new approach to seamless image cloning. Instead of solving a large linear system to compute an interpolating membrane, the method uses mean-value coordinates. The advantages are speed, ease of implementation, small memory footprint, and parallelizability, enabling real-time image and video cloning.

Zeev Farbman
The Hebrew University of Jerusalem

Gil Hoffer
Tel-Aviv University

Yaron Lipman
Princeton University

Daniel Cohen-Or
Tel-Aviv University

Dani Lischinski
The Hebrew University of Jerusalem

SkyFinder: Attribute-Based Sky Image Search

SkyFinder is an interactive sky-search system with over a half million sky images. A set of sky attributes is automaticaly extracted so that the user can easily find a desired sky image using a query like "landscape at sunset with sun on the left", or "blue sky white cloud".

Litian Tao
Lu Yuan
Jian Sun
Microsoft Research Asia

Paint Selection

Paint Selection is a progressive painting-based tool for local selection in images. It helps users quickly make a selection by roughly painting the object of interest and provides high-quality instant feedback, even on multi-megapixel images.

Jiangyu Liu
University of Science and Technology of China

Jian Sun
Microsoft Research Asia

Heung-Yeung Shum
Microsoft Corporation

Video SnapCut: Robust Video Object Cutout Using Localized Classifiers

This paper introduces a robust video object cutout and matting system based on collaboration of local classifiers that adaptively and automatically integrate local features such as color and online learned shape priors. The system achieves state-of-the-art results for complicated videos, including dynamic background and non-rigid foreground deformations.

Xue Bai
University of Minnesota

Jue Wang
David Simons
Adobe Systems, Incorporated

Guillermo Sapiro
University of Minnesota

Modeling and Rendering of Dynamic Shapes (TOG)

Thursday, 6 August | 1:45 - 3:30 pm

Session Chair
Doug James
Cornell University
Submit a Question ➜➜

Efficient Reconstruction of Nonrigid Shape and Motion From Real-Time 3D Scanner Data

This technique takes time sequences of point clouds from real-time 3D scanners as input, possibly showing only partial scans of a deforming object in each frame. The algorithm computes a factorization into a single shape and its deformation over time, thus establishing dense correspondences, removing noise, and filling holes.

Michael Wand
Max-Planck-Institut Informatik

Bart Adams
Stanford University, Katholieke Universiteit Leuven

Maksim Ovsjanikov
Stanford University

Alexander Berner
Martin Bokeloh
Philipp Jenke
Universität Tübingen, WSI/GRIS

Leonidas Guibas
Stanford University

Hans-Peter Seidel
Max-Planck-Institut Informatik

Andreas Schilling
Universität Tübingen, WSI/GRIS

An Edge-Based, Computationally Efficient Formulation of Saint Venant-Kirchhoff Tetrahedral Finite Elements

This paper describes a fast algorithm for tetrahedral FE simulation of Saint Venant-Kirchhoff elastic objects. The number of FLOPs required for computing the vertex forces and tangent stiffness matrices from given vertex positions is 62% to 73% smaller than a conventional method.

Ryo Kikuuwe
Hiroaki Tabuchi
Motoji Yamamoto
Kyushu University

Modeling and Rendering of Dynamic Shapes (TOG) *continued*

Fitting Solid Meshes to Animated Surfaces Using Linear Elasticity

Computing correspondence between time frames of an animated 3D surface is essential for understanding its motion. This paper presents a method that can produce correspondence information for objects that do not undergo large volume or topological changes, such as living creatures, based on linear elasticity with rotation compensation.

Jaeil Choi
Georgia Institute of Technology

Andrzej Szymczak
Colorado School of Mines

Data-Driven Curvature for Real-Time Line Drawing of Dynamic Scenes

This paper presents a method for real-time line drawing of deforming objects. The method learns the mapping from a low-dimensional set of animation parameters to surface curvatures for a deforming mesh. The learned model can then accurately and efficiently predict curvatures and their derivatives, enabling real-time line drawing.

Evangelos Kalogerakis
Derek Nowrouzezahrai
Patricio Simari
James McCrae
Aaron Hertzmann
Karan Singh
University of Toronto

Shape Analysis

Thursday, 6 August | 3:45 - 5:30 pm

Session Chair
Olga Sorkine
New York University
Submit a Question ⇒

Curve Skeleton Extraction From Incomplete Point-Cloud Data

Based on a novel notion of generalized ROtational Symmetry Axis (ROSA), this paper shows how to extract curve skeletons from incomplete point-cloud data and how these skeletons can also be used to enhance performances achieved by popular surface-reconstruction algorithms.

Andrea Tagliasacchi
Richard (Hao) Zhang
Simon Fraser University

Daniel Cohen-Or
Tel Aviv University

Mobius Voting for Surface Correspondence

This work makes use of Mobius transformations to develop an efficient, automatic algorithm for discovering point correspondences between surfaces that are approximately and/or partially isometric.

Yaron Lipman
Thomas Funkhouser
Princeton University

A Benchmark for 3D Mesh Segmentation

This paper describes a benchmark for evaluation of 3D mesh-segmentation algorithms. It investigates the design decisions made in building the benchmark, analyzes properties of human-generated and computer-generated segmentations, and provides quantitative comparisons of seven recently published mesh-segmentation algorithms.

Xiaobai Chen
Aleksey Golovinskiy
Thomas Funkhouser
Princeton University

Interactive Hausdorff Distance Computation for General Polygonal Models

The first real-time algorithm to compute the two-sided Hausdorff distance between arbitrary polygonal models for measurement of shape similarity and penetration-depth computation.

Min Tang
Minkyoung Lee
Young J. Kim
Ewha Womans University

Meshing

Friday, 7 August | 8:30 - 10:15 am

Session Chair
Nina Amenta
University of California, Davis
Submit a Question →→

Interleaving Delaunay Refinement and Optimization for Practical Isotropic Tetrahedron Mesh Generation

This paper presents an algorithm for isotropic tetrahedral mesh generation. The method interleaves Delaunay refinement and mesh optimization to generate quality meshes that satisfy user-defined criteria. This interleaving is shown to be more conservative in Steiner point insertions than refinement alone and to produce higher-quality meshes than optimization alone.

Jane Tournois
INRIA Sophia Antipolis

Camille Wormser
ETH Zürich

Pierre Alliez
INRIA Sophia Antipolis

Mathieu Desbrun
California Institute of Technology

Deforming Meshes That Split and Merge

A method for accurately tracking the moving surface of deformable materials, represented by a triangle mesh, in a manner that gracefully handles topological changes. In regions where topological events are detected, the method inserts a simplified surface created with a standard isosurface-creation method.

Chris Wojtan
Georgia Institute of Technology

Nils Thuerey
Markus Gross
ETH Zürich

Greg Turk
Georgia Institute of Technology

Mixed-Integer Quadrangulation

An approach for fully automatic computation of coarse, structure-aligned quadmeshes. Singularities (vertices that have a non-regular connectivity) are placed with reference to the global structure, enabling high-quality quadrangulations in the sense of CAD models.

David Bommes
Henrik Zimmer
Leif Kobbelt
RWTH Aachen University

Cyclic Plain-Weaving on Polygonal Mesh Surfaces With Graph Rotation System

This paper shows that it is possible to create cycles with an even number of crossings by simply twisting every edge of the manifold mesh. Based on their proof, the authors developed a method to convert any manifold mesh to a plain-weaved basket.

Ergun Akleman
Jianer Chen
Qing Xing
Texas A&M University

Jonathan Gross
Columbia University

Character Animation II

Friday, 7 August | 10:30 am - 12:15 pm

Session Chair
C. Karen Liu
Georgia Institute of Technology
Submit a Question →→

Synchronized Multi-Character Motion Editing

A novel motion-editing technique that allows the user to manipulate synchronized multi-character motions interactively. The paper demonstrates how multiple character motions are synthesized, manipulated, spatially aligned, and temporally synchronized in an interactive system.

Manmyung Kim
Kyunglyul Hyun
Jongmin Kim
Jehee Lee
Seoul National University

Momentum Control for Balance

Momentum control for balance is a novel technique for controlling physically based characters to maintain balance in extreme conditions, for example in the presence of disturbances, low friction, and moving ground. The system guides linear and angular momentum to control the entire body for balancing, resulting in recognizable recovery strategies.

Adriano Macchietto
Victor Zordan
Christian Shelton
University of California, Riverside

Character Animation II *continued*

Contact-Aware Nonlinear Control of Dynamic Characters

A contact-aware physically based locomotion system can generate high-quality animation of agile movements by using a nonlinear controller that plans through frequent contact changes. The control system can yield walking with sudden agile turns, and it is fast enough to compute even for full three-dimensional characters.

Uldarico Muico
Yongjoon Lee
University of Washington

Jovan Popović
Adobe Systems, Incorporated
and University of Washington

Zoran Popović
University of Washington

Linear Bellman Combination for Control of Character Animation

Linear Bellman Combination modifies and improves control policies designed for animation of dynamic characters. For example, a walking controller can either be modified to change the step length or improved to be more resilient to external disturbances.

Marco da Silva
Frédo Durand
CSAIL, Massachusetts Institute of Technology

Jovan Popović
Adobe Systems, Incorporated, University of Washington, and Massachusetts Institute of Technology

Vector Graphics and Point Distributions

Friday, 7 August | 10:30 am - 12:15 pm

Session Chair
Eitan Grinspun
Columbia University
Submit a Question ⇒

A Visibility Algorithm for Converting 3D Meshes Into Editable 2D Vector Graphics

Artists often need to embellish and import 3D CAD-CAM models into 2D vector-graphics software to produce (for example) brochures or manuals. This algorithm performs that tedious task automatically. The derived layered representation facilitates further editing. High-quality illustrations can thus be prepared efficiently.

Elmar Eisemann
Université des Saarlandes, Max Planck Institut Informatik

Sylvain Paris
Adobe Systems, Incorporated

Frédo Durand
CSAIL, Massachusetts Institute of Technology

Local Layering

In a conventional 2D painting or compositing program, graphical objects are stacked in a user-specified global order. This paper shows how to relax this restriction so that users can make stacking decisions on a per-overlap basis.

James McCann
Nancy Pollard
Carnegie Mellon University

Automatic and Topology-Preserving Gradient Mesh Generation for Image Vectorization

A topology-preserving gradient mesh representation for image regions with arbitrary holes and a novel, fully-automatic algorithm that can efficiently compute such a representation. Used with a segmentation algorithm, it is now possible to automatically convert a whole image into gradient mesh representation.

Yu-Kun Lai
Tsinghua University

Shi-Min Hu
Tsinghua University

Ralph R. Martin
Cardiff University

Capacity-Constrained Point Distributions: A Variant of Lloyd's Method

This paper presents a new general-purpose method for optimizing existing point sets. The resulting distributions possess high-quality blue noise characteristics and adapt precisely to given density functions. The method is similar to the commonly used Lloyd's method but avoids its drawbacks.

Michael Balzer
Thomas Schlömer
Oliver Deussen
Universität Konstanz

Physically Based Modeling: From Contact to Capture

Friday, 7 August | 1:45 - 3:30 pm

Session Chair
Adam Bargteil
University of Utah
Submit a Question ➡

Asynchronous Contact Mechanics

This paper presents a method for reliable simulation of elastica in complex contact scenarios. The focus is on firmly establishing three parameter-independent guarantees: simulations of well-posed problems (a) have no interpenetrations, (b) obey causality, momentum- and energy-conservation laws, and (c) complete in finite time.

David Harmon
Etienne Vouga
Breannan Smith
Columbia University

Rasmus Tamstorf
Walt Disney Animation Studios

Eitan Grinspun
Columbia University

Interactive Simulation of Surgical Needle Insertion and Steering

This paper presents algorithms for simulating and visualizing insertion and steering of needles through deformable tissues for surgical training and planning. Novel features include a fast mesh-maintenance algorithm and physics-based methods for needle-tissue coupling.

Nuttapong Chentanez
University of California, Berkeley

Ron Alterovitz
University of North Carolina at Chapel Hill

Daniel Ritchie
Lita Cho
Kris K. Hauser
Ken Goldberg
Jonathan R. Shewchuk
James F. O'Brien
University of California, Berkeley

Capture and Modeling of Non-Linear Heterogeneous Soft Tissue

The major practical contribution of this work is the ability to model rich non-linear deformations without complex decisions about material models and parameters. The method relies on a simple acquisition system, a novel material representation through spatially varying interpolation of fitted linear models, and an efficient deformation-synthesis method.

Bernd Bickel
ETH Zürich

Moritz Baecher
Harvard University

Miguel A. Otaduy
URJC Madrid

Wojciech Matusik
Adobe Systems, Incorporated

Hanspeter Pfister
Harvard University

Markus Gross
ETH Zürich

Physically Guided Liquid Surface Modeling From Videos

This paper presents an image-based reconstruction framework to model real liquid scenes captured by stereoscopic video. The algorithm combines stereo reconstruction with automatically calculated, physically based constraints, which allows effective modeling of complex and dynamic objects such as fluids.

Huamin Wang
Georgia Institute of Technology

Miao Liao
University of Kentucky

Qing Zhang
University of Kentucky

Ruigang Yang
University of Kentucky

Greg Turk
Georgia Institute of Technology

Rendering and Visibility

Friday, 7 August | 1:45 - 3:30 pm

Session Chair
Jason Lawrence
University of Virginia
Submit a Question ➡

An Efficient GPU-Based Approach for Interactive Global Illumination

A GPU-based method for interactive global illumination that integrates complex effects such as multi-bounce indirect lighting, glossy reflections, caustics, and arbitrary specular paths.

Rui Wang
Zhejiang University

Rui Wang
University of Massachusetts

Kun Zhou
Minghao Pan
Hujun Bao
Zhejiang University

Single Scattering in Refractive Media With Triangle Mesh Boundaries

Refractive media such as glass and amber can create surprisingly rich internal caustics even from simple shapes. This paper presents new techniques to explicitly find refracted illumination paths and their energy contributions for the most common geometric representation (triangle meshes with interpolated normals) and demonstrates both CPU and GPU results.

Bruce Walter
Shuang Zhao
Cornell University

Nicolas Holzschuch
INRIA, Universités de Grenoble

Kavita Bala
Cornell University

Rendering and Visibility *continued*

Frequency Analysis and Sheared Reconstruction for Rendering Motion Blur

Based on a frequency analysis for motion-blurred images, this technique shears the reconstruction filter and adapts the sampling at each pixel to match the underlying motion of the signal. Motion-blurred images can be rendered with many fewer samples.

Kevin Egan
Columbia University

Yu-Ting Tseng
Columbia University

Nicolas Holzschuch
INRIA, Universités de Grenoble

Frédo Durand
CSAIL, Massachusetts Institute of Technology

Ravi Ramamoorthi
University of California, Berkeley

Adaptive Global Visibility Sampling

This paper introduces a global visibility algorithm which computes visibility for the whole space of possible viewing positions simultaneously and in a progressive manner by using efficient visibility sampling strategies. The method provides a practical solution to visibility preprocessing and enables new applications in interactive visibility analysis.

Jiří Bittner
Czech Technical University in Prague

Oliver Mattausch
Vienna University of Technology

Peter Wonka
Arizona State University

Vlastimil Havran
Czech Technical University in Prague

Michael Wimmer
Vienna University of Technology

Computational Cameras

Friday, 7 August | 3:45 - 5:30 pm

Session Chair
Tim Weyrich
University College London
Submit a Question ➔➔

Invertible Motion Blur in Video

Linear motion smear in a photo is non-invertible, but this method makes the blur in a video invertible by changing exposure time of successive frames. The paper demonstrates an automatic deblurring approach by creating jointly invertible PSF, estimating PSF, and segmenting moving parts on a non-uniform background without special camera hardware.

Amit Agrawal
Yi Xu
Mitsubishi Electric Research Laboratories

Ramesh Raskar
Media Lab, Massachusetts Institute of Technology

Dark Flash Photography

This camera-and-flash system offers dazzle-free photography by hiding the flash in the non-visible spectrum. A pair of images is captured, one using a multi-spectral flash, the other using the dim ambient illumination. Then the photos are combined to generate a high-quality output image.

Dilip Krishnan
Rob Fergus
New York University

4D Frequency Analysis of Computational Cameras for Depth-of-Field Extension

This paper examines the design of extended depth-of-field systems in the 4D light-field space and derives a bound on the maximal frequency content they can hope to preserve. It also analyzes existing computational-imaging designs and proposes a new lens that extends the depth of field of all known designs.

Anat Levin
The Weizmann Institute of Science

Samuel W. Hasinoff
Paul Green
Frédo Durand
William T. Freeman
CSAIL, Massachusetts Institute of Technology

Bokode: Imperceptible Visual Tags for Camera-Based Interaction From a Distance

Bokodes are tiny barcodes (3 x 3 mm) that encode binary information in angle. The defocus blur of a camera positioned up to four meters away captures this pattern to decode identity, and six-degree-of-freedom pose (angle and distance).

Ankit Mohan
Grace Woo
Shinsaku Hiura
Quinn Smithwick
Ramesh Raskar
Media Lab, Massachusetts Institute of Technology

EXHIBITOR TECH TALKS

Comprehensive summaries of the latest technologies in computer graphics and interactive techniques. SIGGRAPH 2009 exhibitors demonstrate software, hardware, and systems; answer questions; and host one-on-one conversations about how their applications improve professional and technical performance.

Partial list of Exhibitor Tech Talks:

AMD
A Review of GPU-Accelerated Production Rendering

Tuesday, 4 August | 9:45 - 11:30 am

Details to come.

RapidMind, Inc.
Structured Many-Core Computing With RapidMind

Tuesday, 4 August | 3:30 - 5:30 pm

Details to come.

Intel Corporation
Intel Media SDK – Efficient Implementation Techniques

Tuesday, 4 August | 1 - 2:30 pm

Details to come.

Craft Animations and Entertainment AB
How to Accomplish Feature-Film Camera and Vehicle Experience in Real Time

Wednesday, 5 August | 9:45 - 11:30 am

Luigi Tramontana, founder and head of research of Craft Animations, demonstrates a pipeline for rigging an environment with CDS (Craft Director Studio) and preparing it for real-time animation within DeltaGen. The session begins with a summary of the complete workflow, from scene creation to rigging to interactive animation inside DeltaGen:

- A first draft of the scenery and vehicles is selected, and the DeltaGen scene is imported into Maya.
- While the graphics team finalizes the complete scenery inside DeltaGen, the animation team separately begins work on rigging the scene for real-time animation.
- All moving objects are rigged with CDS tools, including cinematic cameras. In this demo, Maya is used to rig the highly complex scene in approximately 30 minutes. The rigging can actually be done inside any other environment CDS has been ported to, such as 3ds Max, C4D, or DeltaGen.
- When the rigging is finished, a CDS-specific rig file is saved for the entire animation setup. This CDS specific rig file is then imported in the finalized DeltaGen scene where all the high-end objects are automatically bound to their respective CDS parts.
- The scene is now ready for real-time interactive animation and real-time cinematic camera work (craning, camera switching, camera rails, follow cameras, zooming, and much more), all within DeltaGen in fantastic real-time rendering.

The session concludes with a series of scenes that demonstrate the vast possibilities this pipeline enables. Real-time interactive cars, airplanes, helicopters, battle tanks, and more all filmed with cinematic camera rigs.

Autodesk, Inc.
Using Nucleus in Maya

Wednesday, 5 August | 1 - 2:30 pm

Web3D Consortium
X3D: Real-Time 3D Solution for Web Authors

Wednesday, 5 August | 3:30 - 5:30 pm

X3D, the only XML-based 3D file format and run-time architecture for web authors, remains the most widely used ISO open standard for implementation of high-integrity, high-capability 3D systems. With its rich set of componentized features, X3D is used in more and more 3D markets and hardware platforms. X3D has a large innovative community of content and applications developers, and it ensures interoperability, and ownership of your 3D content. In this session, X3D innovators show off their latest real-world 3D applications and content, and demonstrate how you can protect your 3D content in this ever-changing competitive market.

Presented by Bitmanagement, Fraunhofer Heinrich-Hertz-Institut, Naval Postgraduate School, Yumetech, and others.

RapidMind, Inc.
RapidMind: Accelerating Medical Imaging Applications

Thursday, 6 August | 9:45 - 11:30 am

Details to come.

AMD
Thursday, 6 August | 1 - 2:30 pm

Details to come.

EXHIBITOR LIST

3D Consortium
3D for All Computing Development
3dMD a 3Q company
3DTotal.com
3DVIA, Dassault Systemes
A K Peters, Ltd.
Aberdeen LLC
Academy of Art University
Addison-Wesley
AJA Video Systems Inc.
AMD
American Paper Optics, Inc.
Anatomytools.com
Andersson Technologies LLC
Animation Magazine Inc.
The Art Institutes
Autodesk, Inc.
AutoDesSys, Inc.
Axceleon Inc.
Baton Rouge Digital Industries
    Consortium
Bell Computer
Blender Institute
Blue Sky Studios, Inc.
BlueArc Corporation
CAP DIGITAL Paris Region
Caustic Graphics, Inc.
cebas Computer GmbH
Center for Computation & Technology
    at Louisiana State University
CGAL-The Computational Geometry
    Algorithms Library
CG Wave, Inc.
Chaos Software Ltd.
Computer Graphics World
    (COP Communications, Inc.)

Course Technology PTR, a part
    of Cengage Learning
Craft Animations and Entertainment AB
DigiPen Institute of Technology
Digital Domain Productions, Inc.
Dimension 3D Printing
Dimensional Imaging Ltd.
EEFX.COM - Chroma Key Screens
    & Supplies
EnvisionTEC
e-on software, inc.
EON Reality, Inc.
ETRI (Electronics and Telecommunications
    Research Institute)
eyeon Software Inc.
Flashpoint, The Academy of Media Arts
    & Sciences
Focal Press
Frantic Films
Fraunhofer HHI
Future Publishing Limited
Google
Grasshorse LLC
Greater New Orleans, Inc.
i3D SP. Z0.0.
IdN magazine
Image Metrics
IntegrityWare, Inc.
Intel Corporation
Intelligraphics Inc.
Interactive Data Visualization/SpeedTree
InterSense, Inc.
iPi Soft
Isilon Systems, Inc.
It's Art
JourneyEd.com
LAIKA
Lightspeed Design, Inc.
LightWork Design
Lumiscaphe
MAXON Computer Inc.
Measurand Inc.
Motion Analysis Corporation
National Institute of Health - NICHD
    UCSS
NaturalPoint Inc.
NETDIMENSION CORPORATION
New York University - CADA
Nexstar
Next Limit Technologies
NVIDIA Corporation

Objet Geometries Ltd.
OC3 Entertainment, Inc.
PILGWAY
PipelineFx, LLC
Pixar Animation Studios
PNY Technologies
Point Grey Research Inc.
Polhemus
Purdue University, Department of
    Computer Graphics Technology
RapidMind Inc.
Raven3D
RedEye ARC
Renderosity
Rhythm & Hues Studios
Ringling College of Art and Design
Robert McNeel & Associates
Savannah College of Art and Design
Seoul Business Agency
Shapeways
Side Effects Software Inc.
Smith Micro Software, Inc.
SpheronVR AG
Springer
Stash Media Inc.
Studica, Inc.
TEAC America, Inc.
TechViz
Texas Memory Systems
Texas State Technical College
The Pixel Farm
The3DShop.com
Tobii Technology AB
T-Splines, Inc.
TurboSquid, Inc.
University of Central Florida - Florida
    Interactive Entertainment Academy
Vancouver Film School
Verari Systems, Inc.
VisTrails Inc.
Wacom Technology Corporation
Web3D Consortium
Wiley Publishing
Wolfram Research, Inc.
Xerox Corporation
Xsens Technologies B.V.
Yuan Fang Computer Software
    Engineering Co. Ltd.
Zygote Media Group, Inc.

Separate registration is required.

CO-LOCATED WORKSHOPS & EVENTS

Presented in cooperation with ACM SIGGRAPH, these small symposia are related to important aspects of computer graphics and interactive techniques.

High Performance Graphics 2009

1 -3 August

The High-Performance Graphics 2009 conference synthesizes two important and cutting-edge topics in computer graphics:

- Graphics Hardware, represented since 1986 by an annual conference of that name, focusing on graphics hardware, architecture, and systems.
- Interactive Ray Tracing, represented since 2006 in an innovative symposium focusing on the emerging field of interactive ray tracing and global illumination techniques.

By combining these two communities, we aim to bring to authors and attendees the best of both, while extending the scope of the new conference to cover the overarching field of performance-oriented graphics systems, including innovative algorithms, efficient implementations, and novel hardware architectures. This broader focus offers a common forum for researchers, engineers, and architects to discuss the complex interactions of massively parallel hardware, novel programming models, efficient graphics algorithms, and innovative applications.

www.highperformancegraphics.org ➜➜

NPAR 2009
7th International Symposium on Non-Photorealistic Animation & Rendering

1 - 2 August

NPAR 2009, the 7th international symposium dedicated to non-photorealistic animation and rendering, sponsored by ACM SIGGRAPH and in cooperation with Eurographics. Non-photorealistic animation and rendering (NPAR) refers to techniques for visually communicating ideas and information. Such techniques usually generate imagery which is expressive, rather than "photorealistic". This research deals with both the mechanisms of non-photorealistic rendering techniques as well as the principles of visual communication via such artistic rendering.

www.cs.rug.nl/svcg/npar2009/ ➜➜

SBIM 2009: Sixth Eurographics Symposium on Sketch-Based Interfaces and Modeling

1 - 2 August

The Sixth ACM/Eurographics Symposium on Sketch-Based Interfaces and Modeling provides a venue for exploring the models, algorithms and technologies needed to enable effective sketch-based interfaces. It focuses on novel methods for classification and recognition of hand-drawn shapes, and methods for using these techniques to create or edit digital models — everything from text and mathematics to 2D diagrams to building and animating models in 3D. In addition to systems that build models, the symposium also presents empirical user studies aimed at evaluating the effectiveness of these sketch-based interfaces.

sbim09.cse.wustl.edu/index.php ➜➜

Symposium on Computer Animation

1 - 2 August

The Symposium on Computer Animation (SCA) is the premier forum for innovations in the software and technology of computer animation. The eighth annual event unites researchers and practitioners working on all aspects of time-based phenomena. Our focused, intimate gathering, with single track program and emphasis on community interaction, makes SCA the best venue to exchange research results, get inspired, and set up collaborations.

www.cs.ubc.ca/~van/sca/sca.html ➜➜

GENERAL INFORMATION

Airport Shuttle Discounts
SIGGRAPH 2009 has partnered with Airport Shuttle to offer transportation to and from Louis Armstrong International Airport (MSY). SIGGRAPH 2009 attendees receive a $2 discount on a round-trip ticket when they book service through Airport Shuttle. These discounts are valid from 25 July until 13 August 2009.

Bookstore
BreakPoint Books offers the latest and greatest books, CDs, and DVDs on computer animation, graphic design, gaming, 3D graphics, modeling, and digital artistry. The bookstore features recent books by SIGGRAPH 2009 speakers and award winners. To suggest books, CDs, or DVDs that should be available in the bookstore, contact:

Breakpoint Books
800.968.9622
+1.352.383.4656
+1.352.383.4403 fax
dave@breakpointbooks.com
www.breakpointbooks.com

Childcare
Contact your hotel concierge for suggestions.

Ernest N. Morial Convention Center
900 Convention Center Boulevard
New Orleans, Louisiana 70130

Accessibility
The convention center is handicap accessible. If you have special needs or requirements, please call Conference Management at:

+1.312.644.6610

Business Center
The Ernest N. Morial Convention Center Business Center offers copy and fax services, digital printing, sign and banner making, mobility scooter rentals, instant business cards, office and exhibit supplies, and small parcel shipping services.

Food Services
Several restaurants, concessions, and food carts are available throughout the convention center for the convenience of SIGGRAPH 2009 attendees.

Parking
Parking is available at AMPCO/Fulton Street Garage located across the street from the Ernest N. Morial Convention Center at 901 Convention Center Boulevard for $10 per day. There are no in/out privileges.

Internet Access
Free wireless access will be available for SIGGRAPH 2009 attendees throughout the Ernest N. Morial Convention Center.

Shuttle Service
SIGGRAPH 2009 provides complimentary shuttle service between many conference hotels and the Ernest N. Morial Convention Center.

IMPORTANT NOTICE
Attendees who use the SIGGRAPH 2009 hotel reservation system to make reservations at hotels served by the SIGGRAPH shuttle buses will receive a shuttle wristband when they check in. Attendees who do not book through the SIGGRAPH 2009 reservation system and wish to use the shuttle service can purchase wristbands at the SIGGRAPH Store. Attendees without wristbands will not be allowed to use the shuttle service. All badged attendees will be able to ride the shuttle buses to the reception. Wristbands will not be required.

Special Policies
Lost badges cannot be replaced. If you lose your badge, you must purchase a new registration. Technical materials included with your registration must be picked up at the SIGGRAPH 2009 Merchandise Pickup Center. Lost merchandise vouchers will not be replaced.

Passes: To be admitted to the Reception, you must have a ticket (your badge does not provide access). Computer Animation Festival access comes with a Full Conference badge, or a Festival Pass.

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 2009. Abuse of this policy will result in the loss of the individual's registration credentials.

SIGGRAPH 2009 reserves the right to deny registration or entrance to any attendee or prospective attendee, and to cancel an existing registration, if it determines that a registration or an attendee is not in the best interest of SIGGRAPH 2009 or ACM SIGGRAPH.

Travel & Housing
Visit the SIGGRAPH 2009 web site to access the easy to use online hotel reservation system, which includes complete information on housing policies, procedures and rates:

www.siggraph.org/s2009

Or contact:
SIGGRAPH 2009 Travel Desk
110 West Hubbard
Chicago, Illinois 60654 USA
800.631.5557 (Continental US and Canada)
+1.312.527.7300
+1.312.329.9513 fax
siggraph2009@ttgonline.com

SIGGRAPH 2009 has negotiated discount rates for hotels in New Orleans. These discounts are available to SIGGRAPH 2009 attendees only. Please make your hotel reservation by 3 July 2009. Reservations made after 3 July will be based on availability only and rates may increase.

Conference Registration Categories

■ Full Conference Access
● Basic Access
▲ Computer Animation Festival

Sessions

■	●	▲	Awards Presentation
■			Courses/Panels/Talks
■	●	▲	Exhibitor Tech Talks
■	●	▲	Keynote Speakers
■			Papers: Technical, Art, Games

Galleries & Experiences

■	●	Art & Design
		BioLogic: A Natural History of Digital Life
		Generative Fabrication
■	●	Emerging Technologies
■	●	▲ Exhibition
■	●	Information Aesthetics Showcase
■	●	Posters
■	●	The Sandbox
■	●	The Studio

Contests & Competitions

■	●	▲	FJORG!
■	●	▲	GameJam!
■	●	▲	Social Game

Performances & Special Events

■	●	▲	Music and Audio
■	●	▲	Technical Papers Fast Forward

Community

■	●	▲	Birds of a Feather
■	●		International Resources
■	●	▲	Job Fair

Computer Animation Festival

■	▲	Evening Theaters
■	▲	Festival Panels, Talks
■	▲	Production Sessions
■	▲	Real-Time Rendering
■	▲	Stereoscopic 3D
■	▲	Visual Music

Documentation

■	Full-Conference DVD-ROM

Technical Materials

The printed ACM Transactions on Graphics (Conference Proceedings Special Issue), which contains the Technical Papers and the ACM SIGGRAPH awards are NOT included with any registration category. They are available for purchase at SIGGRAPH 2009.

■

Full Conference DVD-ROM

This digital publication contains the electronic version of the Technical Papers, including images and supplemental material; all of the class and tutorial notes, including supplemental material (movies, source code, HTML presentations); and the permanent record of the Courses, Emerging Technologies, Panels, Posters, Talks, and the permanent record of the Art & Design Galleries and the Computer Animation Festival. The DVD is included with all Full Conference registrations, and it is available for purchase at SIGGRAPH 2009. The content of the printed version of the *ACM Transactions on Graphics* (Conference Proceedings Special Issue) is included on the Full Conference DVD-ROM.

Basic Conference registration does not include any technical materials. The Full Conference DVD-ROM and the *ACM Transactions on Graphics* (Conference Proceedings Special Issue) are available for purchase at SIGGRAPH 2009.

NOTE:
Full Conference registrants must pick up the Full Conference DVD-ROM included with registration at SIGGRAPH 2009 Merchandise Pickup Center

Technical Materials are also available after the conference, contact:

ACM, Member Services
800.342.6626 (Continental US and Canada)
+1.212.626.0500 (International and New York Metro area)
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orders@acm.org

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ACM SIGGRAPH is a diverse group of researchers, artists, developers, filmmakers, scientists, and other professionals, who share an interest in computer graphics and interactive techniques. The community values excellence, passion, integrity, volunteerism, and cross-disciplinary interaction.

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Margaret Hospital (UHN)

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Northeastern University

Web Programming
The OPAL Group

The printed ACM Transactions on Graphics (Conference Proceedings Special Issue) is not included in your registration and may be purchased separately.

Member rates refer to ACM SIGGRAPH membership.

Conference Registration Categories

■ Full Conference Access
● Basic Access
▲ Computer Animation Festival

REGISTRATION FEES & INFORMATION

■ Full Conference Access

	ON OR BEFORE 26 JUNE	ON OR BEFORE 24 JULY	AT SIGGRAPH 2009
ACM SIGGRAPH Member	$850	$1,025	$1,125
Non-Member	$900	$1,050	$1,175
Student Member	$350	$400	$450

Includes admission to ALL conference programs and events, including the Exhibition (Tuesday - Thursday), Computer Animation Festival, and Reception. Also includes the Full Conference DVD-ROM.

■ Full Conference One-Day Pass

	ON OR BEFORE 26 JUNE	ON OR BEFORE 24 JULY	AT SIGGRAPH 2009
ACM SIGGRAPH Member	$295	$295	$395
Non-Member	$345	$345	$445
Student Member	$150	$150	$200

Includes admission to ALL conference programs and events for one day of SIGGRAPH 2009, and the Exhibition (Tuesday - Thursday). A Computer Animation Festival Full Festival Pass for all days can be added at the time of registration, at a discounted fee of $100.

● Basic Conference Access

	ON OR BEFORE 26 JUNE	ON OR BEFORE 24 JULY	AT SIGGRAPH 2009
ACM SIGGRAPH Member	$95	$125	$150
Non-Member	$125	$150	$175

Includes admission to all days of the Exhibition (Tuesday-Thursday) and Galleries & Experiences, Contests & Competitions, Performances & Special Events, and Community Activities, as well as Keynote Speakers and Exhibitor Tech Talks. See Registration Category Chart for a complete list of what's included.

● Basic Conference One-Day Pass

	PURCHASED BEFORE OR AT SIGGRAPH 2009
	$45

Includes admission to Galleries & Experiences, Contests & Competitions, Performances & Special Events, and Community Activities for any ONE day, as well as Keynote Speakers and Exhibitor Tech Talks on that day. Also includes admission to ALL days of the Exhibition (Tuesday - Thursday). A Reception ticket and the Full Conference DVD-ROM are not included; they can be purchased separately. A Computer Animation Festival Full Festival Pass for all days can be added at the time of registration, at a discounted fee of $175.

▲ Computer Animation Festival

	FULL FESTIVAL PASS	ONE-DAY PASS
ACM SIGGRAPH Member	$175	$50
Non-Member	$200	$50

Unemployed Discount Registration

Because of the current economic situation, many people in our community find themselves currently unemployed, and so would have difficulty affording to attend SIGGRAPH 2009. We believe that in these times it's especially important that members of the SIGGRAPH community continue to come together to make connections, provide mutual inspiration, and continue to look forward and help create the future.

So we will extend our lowest possible registration rates — **the same as Student Member rates** — to unemployed members of our community who would otherwise be unable to afford attending the conference.

Unemployed Discount Registration will open in mid-June. Further details will be available on the conference registration advance web page at:
www.siggraph.org/s2009