

# BASIC CONFERENCE FINAL PROGRAM

THE 36<sup>TH</sup> INTERNATIONAL CONFERENCE AND EXHIBITION  
ON COMPUTER GRAPHICS AND INTERACTIVE TECHNIQUES



**SIGGRAPH**2009

[www.siggraph.org/s2009](http://www.siggraph.org/s2009)

**NEW ORLEANS**

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



Sponsored by ACM SIGGRAPH

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# STIMULATE. COLLABORATE. CREATE.

**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

### LOCATION

La Nouvelle Orleans Ballroom



#### 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, 4 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 Awards

**Award Presentations:** Monday, 3 August, 10:30 am  
La Nouvelle Orleans Ballroom

**Award Winner Talks:** Monday, 3 August, 1:45-3:30 pm  
Hall E 1-2

#### The Steven Anson Coons Award for Outstanding Creative Contributions to Computer Graphics

**Robert L. Cook**  
Pixar Animation Studios

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

**Michael Kass**  
Pixar Animation Studios

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

**Wojciech Matusik**  
Adobe Systems, Inc.

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

**Lynn Hershman Leeson**  
University of California, Davis

**Roman Verostko**  
Minneapolis College of 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.

# SESSIONS

## Courses →

Monday - Friday, 3 - 7 August

### Auditorium A and B

Courses require Full Conference Access, however "Introduction Computer Graphics" and "An Introduction to Shader-BasedGL Programming" courses are open to attendees with Basic Conference Access.

## Exhibitor Tech Talks →

Tuesday - Thursday, 4 - 6 August

### Back of Hall F

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.

## Exhibition →

Tuesday - Thursday, 4 - 6 August

### Hall F & G

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.

## Information Aesthetics Showcase →

Monday - Friday, 3 - 7 August

### Rooms 274 - 277

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

### Auditorium Lobby

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, Tuesday, 4 August and Thursday, 6 August, 12:15 - 1:15 pm.

## The Sandbox →

Monday - Friday, 3 - 7 August

### Outside Room 334 Lobby

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

### Rooms 343-345

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 Final Presentation →

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

### Rooms 265 - 266

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

### Rooms 255 - 257

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

### Rooms 255 - 257

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 | 1:45 - 3:30 pm

### Rooms 265 - 266

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.

# GALLERIES & EXPERIENCES

## ART & DESIGN

### BioLogic: A Natural History of Digital Life →

Monday - Friday, 3 - 7 August

#### Rooms 352 - 355

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

#### Rooms 356-357

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

### Rooms 337 - 342 & 346 - 351

Hands-on interaction with innovative technologies and applications in many fields, including displays, robotics, input devices, and haptics.

## CONTESTS & COMPETITIONS (CONTINUED)

### Social Game →

Monday - Thursday, 3 - 6 August

Hall G Lobby

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".

### SpeedLab →

Opening Session

Sunday, 2 August | 4 - 5 pm

Rooms 265 - 266

### Judging Ceremony

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

Auditorium B

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 Performances →

Monday - Thursday, 3 - 6 August

Rooms 243 - 245

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

### Technical Papers Fast Forward

Monday, 3 August | 6 - 8 pm

Hall E 1 - 2

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. See the Conference Locator for a complete list of the Birds of a Feather sessions.

### International Resources →

Monday - Friday, 3 - 7 August

Hall G (SIGGRAPH Village)

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

Hall G

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.

## LAISSÉZ LES JEUX COMMENCENT!

SIGGRAPH 2009 presents two real-time, real-life game opportunities:



### Encounter SIGGRAPH 2009 - A Mobile Phone Adventure →

Tuesday - Wednesday, 4 - 5 August, 10:30 am - 6 pm

Hall G Lobby

A new way to explore SIGGRAPH -- A conference-wide high-tech mobile phone scavenger hunt that will guide you through the highlights of the conference and even take you on a high-tech interactive tour of New Orleans! Play individually or in teams. Prizes awarded to top scorers. For more information see: <http://www.encountersiggraph.org>



### The Collectible Business Card Game →

Hall G Lobby

Build your network, have fun, and learn a little about the industry along the way. The Collectible Business Card Game is an "open-source" collectible card game played with real business cards. "Collect" old friends and make new ones, then debate how talented they are. It's all about discussion and negotiation. For complete rules and information visit [wiki.siggraph.org/cbcg](http://wiki.siggraph.org/cbcg)

## Conference Policies

- **Passes:** To be admitted to the Reception, you must have a ticket. (Your registration badge does not provide access.) Computer Animation Festival access is included with Full Conference Access and the Festival pass.
- 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.
- Lost badges cannot be replaced. If you lose your badge, you must register again at the published rates to obtain a new badge. Lost merchandise vouchers will not be replaced.
- SIGGRAPH 2009 conference documentation and pre-purchased merchandise will not be shipped, nor will refunds be given for any material that is not picked up at the Merchandise Pickup Center.

## Age Requirement Policies

- Registered attendees under the age of 16 must be accompanied by an adult at all times.
- Children under 16 are not permitted in the Exhibition. Age verification is required.

## 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 online through Airport Shuttle Reservations at [www.siggraph.org/s2009](http://www.siggraph.org/s2009). These discounts are valid from 25 July until 13 August 2009.

## Bookstore

Room 270

**Monday, 3 August**

8 am - 7 pm

**Tuesday - Friday, 4 - 7 August**

8 am - 6 pm

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.

## Camera/Recording Policies

No cameras or recording devices are permitted at SIGGRAPH 2009. Abuse of this policy will result in revocation of the individual's registration credentials.

SIGGRAPH 2009 employs a professional photographer and reserves the right to use all images that this photographer takes during the conference for publication and promotion of future ACM SIGGRAPH events.

## Computer Animation Festival Passes

Computer Animation Festival access is included with Full Conference Access and the Festival pass. You can add the week-long Festival Pass to your Basic Access registration at a discounted price, or you can add the Festival to a Basic One-Day pass.

## Conference Management Office

+1.504.670.4002

Rooms 267-268

If you have questions regarding SIGGRAPH 2009, call or stop by this office anytime during conference hours.

## Ernest N. Morial Convention Center

### ACCESSIBILITY

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

+1.504.670.4002

### BUSINESS CENTER

+1.504.670.8941

Hall F Lobby

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.

## Exhibition Management Office

+1.504.670.4008

Hall F (Back of the Hall)

Representatives are available during conference hours to meet with exhibitors and help with plans for exhibiting at SIGGRAPH 2009 and 2010.

## Exhibitor Registration

Hall F

Open during registration hours. See Registration.

## First Aid Office\*

Hall F Lobby

**Sunday, 2 August**

7:30 am - 6:30 pm

**Monday, 3 August**

7 am - 9:30 pm

**Tuesday - Wednesday, 4-5 August**

7:30 am - 9:30 pm

**Thursday, 6 August**

9 am - 9 pm

**Friday, 7 August**

7:30 am - 6 pm

*\* For emergencies, contact the Conference Management Office at +1.504.670.4002 (do not call 911 directly, Conference Management will provide faster response within the convention center).*

## Housing Desk

+1.504.670.4010

Hall F

Complete information about SIGGRAPH 2009 hotel accommodations. Open during registration hours. See Registration.

## Lost and Found

Hall F (next to Registration)

To inquire about lost items during the conference. (Note: On Friday the Lost and Found desk will be located in the SIGGRAPH Store, Hall E Lobby.) After the conference, all lost-and-found items will be turned over to the Ernest N. Morial Convention Center Security Office, Room H116 located outside of Hall H.

## Luggage and Coat Check

Hall G Lobby

**Monday, 3 August**

7:30 am - 9:30 pm

**Tuesday - Thursday, 4 - 6 August**

8 am - 9:30 pm

**Friday, 7 August**

8 am - 6 pm

Luggage and Coat Check service is available for briefcases, backpacks, and other small items during the hours listed below. SIGGRAPH 2009 is not responsible for items left in the Luggage and Coat Check area.

## Merchandise Pickup Center

Your conference documentation (included with registration) must be picked up at the Merchandise Pickup Center. Conference documentation and pre-purchased merchandise will not be shipped, nor will refunds be given for any material that is not picked up at the Merchandise Pickup Center. Open during registration hours. See Registration.

## Parking

+1.504.566.1010

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.

## Reception

Co-sponsored by Side Effects Software



**Thursday, 6 August, 8 - 10 pm**

**Blaine Kern's Mardi Gras World**

(Included with Full Conference Registration. Reception tickets are available at the Registration counter in Hall F. The cost is \$55 per person. All sales are final.)

Join friends and colleagues from around the world to celebrate the spirit of New Orleans. Wander among towering figures of fantasy. Marvel at the skill and technology that animate the mega-floats of Mardi Gras. Enjoy delicious Crescent City cuisine and refreshing libations.

Mardi Gras World is located just south of the Ernest N. Morial Convention Center. The best way to get to the reception is on foot, as part of the traditional New Orleans "second-line" street parade that departs the convention center at approximately 7 pm in front of Halls D & E.

## Registration/Merchandise Pickup Center

Hall F

**Sunday, 2 August**

2 - 6 pm

**Monday, 3 August**

7:30 am - 6 pm

**Tuesday - Thursday, 4 - 6 August**

8 am - 6 pm

**Friday, 7 August**

8 am - 3:30 pm

## Restaurant Reservations/City Information

+1.504.670.8905

Hall F (near Registration)

**Sunday - Friday, 2 - 7 August**

9 am - 5 pm

General conference information, New Orleans restaurant reservations and New Orleans city information.

## Shuttle Bus Service

+1.410.507.0971

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

### IMPORTANT NOTICE

Attendees who used the SIGGRAPH 2009 hotel reservation system to make reservations at hotels served by the SIGGRAPH shuttle buses will receive a complimentary shuttle wristband when they check in. Attendees who did not book through the SIGGRAPH 2009 reservation system and wish to use the shuttle service can purchase wristbands at the SIGGRAPH Store for \$75. Attendees without wristbands will not be allowed to use the shuttle service. One exception: all attendees with badges or reception tickets will be able to ride the shuttle buses to and from the reception, without needing a wristband.

### HOTEL SHUTTLE SERVICE HOURS

**Sunday, 2 August**

1:30 - 6 pm

**Monday - Thursday, 3 - 6 August**

7 - 11:30 am and 5 - 9:30 pm

**Friday, 7 August**

7 - 11:30 am and 1:30 - 6 pm

Hotel shuttle service will pick-up and drop-off attendees outside Hall D & E of the Ernest N. Morial Convention Center.

The last shuttle from Blaine Kern's Mardi Gras World will depart at 10:30 pm.

## SIGGRAPH Encore Conference Presentations DVD-ROM

La Nouvelle Orleans Ballroom Lobby

The SIGGRAPH Encore Conference Presentations DVD-ROM set returns in 2009! Get the SIGGRAPH 2009 conference presentations on a 2 disc DVD-ROM set. Visit the SIGGRAPH Encore booth in the La Nouvelle Orleans Ballroom Lobby for more information and to place your order.

## SIGGRAPH Store

Hall E Lobby

Review and purchase additional technical materials and gifts (t-shirts, polo shirts, coffee mugs, baseball cap) for friends, family, and colleagues.

**Sunday, 2 August**

noon - 6 pm

**Monday - Thursday, 3 - 6 August**

8 am - 6 pm

**Friday, 7 August**

8 am - 3:30 pm

## Speaker Prep

Rooms 278-279

**Sunday, 2 August**

9 am - 7 pm

**Monday - Thursday, 3 - 6 August**

7 am - 7 pm

**Friday, 7 August**

7 am - 2 pm

Pick up your registration credentials and conference information. Then go to the Speaker Prep Room to collect your Speaker Ribbons and badge holder.

If you are presenting at the conference, you should check in with Speaker Prep at least 24 hours before your session to review and upload your materials, practice your presentations, and test the playback of your media.

## Technical Materials Sold After the Conference

### Full Conference DVD-ROM

**Member: \$65; Non-Member: \$100**

This digital publication contains the electronic version of the Technical Papers, including images and supplemental material; all of the Course Notes, including supplemental material (movies, source code, HTML presentations); and the permanent record of the Courses, Emerging Technologies, Panels, Posters, Talks, the Art & Design Galleries, and the Computer Animation Festival. (A complimentary copy of the Full Conference DVD-ROM is included with Full Conference Access registration.)

### ACM Transactions on Graphics (Conference Proceedings Special Issue) - Printed

**Member: \$35; Non-Member: \$52**

Contains the SIGGRAPH 2009 Technical Papers and the ACM SIGGRAPH awards.

### Leonardo, the Journal of the International Society of the Arts, Sciences and Technology (ISAST) (Special Issue)

**Member: \$17; Non-Member: \$25**

This printed publication contains the permanent record of the juried Art Gallery

### Sandbox: ACM SIGGRAPH on Video Games

**Member: \$20; Non-Member: \$30**

This printed and CD-ROM proceedings contains the Game Papers. The CD-ROM also contains supplemental material in support of the Game Papers.

### SIGGRAPH 2009 Video Review

**Member: \$120; Non-Member: \$180**

This series of three DVDs documents the Computer Animation Festival programs. Individual DVD programs are available for purchase at SIGGRAPH 2009 registration, at the SIGGRAPH Store, and at the SIGGRAPH Video Review booth outside the Computer Animation Festival venues. Member: \$40 each; non-member: \$60 each.

### SIGGRAPH Asia 2008 Video Review

**Member: \$30; Non-Member: \$45**

Highlighted works from the SIGGRAPH Asia 2008 Computer Animation Festival in Singapore, December 2008.

To order these materials after the conference, contact:

#### ACM Member Services

800.342.6626 (Continental US and Canada)

+1.212.626.0500 (International and New York Metro area)

+1.212.944.1318 fax

orders (at) acm.org

## Telephone Numbers

### Business Center

+1.504.670.8941

### Conference Management Office

+1.504.670.4002

### Exhibition Management Office

+1.504.670.4008

### Housing Desk

+1.504.670.4010

### Media Headquarters

+1.504.670.4011

### Parking

+1.504.566.1010

### Restaurant Reservations/

City Information

+1.504.670.8905

### Shuttle Bus Service

+1.410.507.0971

## Wireless Internet Access

SIGGRAPH 2009 provides 802.11 a/b/g wireless network access throughout the Ernest N. Morial Convention Center. To use the wireless network, attendees should have their own wireless (802.11a, b, or g compatible) cards.

Please refer to your laptop operating system and client adapter documentation and follow this procedure:

1. Document all existing TCP/IP and wireless configuration information before you make any changes.
2. Configure your laptop to use DHCP.
3. Configure your wireless adapter network Name (SSID) to be "s2009".
4. Disable encryption on your wireless adapter.

The SIGGRAPH 2009 wireless network provides open, unencrypted communications for conference attendees. The system is not secure and can be monitored by others.

# MUSIC PERFORMANCES

LOCATION

Rooms 243 - 245

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

## See What You Feel: A Study 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 Rován 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 karesansui, 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 Rován, 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 Rován**

**Kevin Patton**

Brown University

**Maria Del Carmen Montoya**

## 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

## 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 Jordà**

Universitat Pompeu Fabra

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 Fregel

Northeastern University

# COURSES

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. To purchase a copy of the Full Conference DVD-ROM visit the SIGGRAPH Store in Hall E Lobby.

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).

## Introduction to Computer Graphics

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

Auditorium A

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**

### Schedule

1:45 pm	Introduction and Overview
1:50 pm	3D Overview
2 pm	3D Modeling Demos
2:45 pm	3D Rendering Demos
3:30 pm	Break
3:45 pm	3D Animation Demos
3:55 pm	2D Overview
4:05 pm	2D Design Demos
4:40 pm	2D Programming Demos
5:15 pm	Questions & Answers

## An Introduction to Shader-Based OpenGL Programming

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

Level: Introductory

Auditorium B

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.

### Schedule

1:45 pm	Welcome, Introduction, and Overview <b>Angel</b>
1:55 pm	Getting Started With OpenGL <b>Angel</b>
2:35 pm	Working With Objects in OpenGL <b>Shreiner</b>
3:20 pm	The OpenGL Shading Language <b>Angel</b>
3:30 pm	Break
3:45 pm	The OpenGL Shading Language - continued
4:20 pm	Lighting <b>Shreiner</b>
4:40 pm	Texture Mapping <b>Shreiner</b>
5:20 pm	Questions & Answers <b>Shreiner and Angel</b>

# BIOLOGIC: A NATURAL HISTORY OF DIGITAL LIFE



## DAYS & HOURS

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

## LOCATION

Rooms 352-355

The artworks chosen for the SIGGRAPH 2009 juried art exhibition explore what can happen when nature and technology combine. Recent projects by 11 artists representing 10 countries offer both serious and playful scenarios in which biological forms and life processes are grafted together with digital code and devices. All of the projects are kinetic, most are interactive, and many are large installations that immerse the viewer in fantastic environments of shivering tendrils, singing strands of hair, and fuzzy, cloud-like surfaces that respond when stroked. The complex technologies and intriguing topics encountered in the exhibition offer viewers a compelling survey of ideas and issues that characterize contemporary life - a tangle of digital devices, natural processes, and us.

A Special Issue of *Leonardo*, *The Journal of the International Society of the Arts, Sciences and Technology* will feature the artists and projects included in BioLogic along with SIGGRAPH 2009 [Art Papers →→](#). The exhibition is also closely related to [Generative Fabrication →→](#), the Design & Computation exhibition. Together, the two exhibitions present an enthralling range of art and design projects that incorporate biological information and processes.

### Reception

#### Celebrating the Special Issue of *Leonardo* and SIGGRAPH 2009 Art & Design Galleries

Tuesday, 4 August, 1:30 - 3:30 pm  
Lobby outside Rooms 353-355

Drink a toast to the SIGGRAPH special issue of *Leonardo* and the SIGGRAPH 2009 art and design galleries. Talk with the artists, designers, and Art Papers authors about their work. Meet the members of the SIGGRAPH 2009 committee who organized this year's exhibits of digital art and design.

## Artifacts from a Parallel Universe: Tentative Architecture of Other Earth\_Coastline Inhabitants

---

Artifacts from a Parallel Universe is a garment that emulates the breathing of its wearer, and its form is inspired by marine coral. Using sensors and shape-memory alloys embedded in hand-knitted and felted wool, this garment blurs the boundaries between garment, technology, environment, and wearer. Eskandar is an artist and architect. This piece was produced by Grant Davis in collaboration with Joshua Hernandez (electronics) and Christopher O'Leary (photography).

### **Xárene Eskandar**

UCLA Design | Media Arts, Architecture

## Biological Instrumentation

---

Biological Instrumentation is a time-based spatial installation of mimosa plants, each connected by a series of tubes to an air compressor and wired with audio speakers and other electronic equipment. Algorithmically triggered compressed air forces the plants to contract. As the plants begin to open their leaves again, sound signals play from the audio speakers. This work explores the poetics involved in creating new relationships between machines and plant life. Nina Tommasi is an Austrian-born media artist and architect.

### **Nina Tommasi**

## Electric Eigen-Portraits Face Shift

---

Electric Eigen-Portraits and Face Shift are original performances of algorithmic facial choreography exhibited as two video works. These works turn a computer-controlled human face into a medium for kinetic art. Arthur Elsenaar is an artist and an electrical engineer, finishing his PhD work investigating the choreographic capabilities of the computer-controlled human face. He collaborated with Remko Scha, artist, programmer, and professor of computational linguistics at the University of Amsterdam.

### **Arthur Elsenaar**

Nottingham Trent University

## Fur-Fly

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Fur-Fly is a tactile display composed of individual pieces of faux fur that uses sensor-driven computer technology to control the movement of the components in response to the user and to transform the visual effects projected onto the surface. The texture of the display surface encourages interaction. Kumiko Kushiyama is an artist, interaction designer, and professor at Tokyo Metropolitan University. Shinji Sasada is an artist and advanced computer graphics designer. Soichiro Takeyama is studying advanced technology and computer graphics at Japan Electronics College.

### **Kumiko Kushiyama**

Tokyo Metropolitan University

### **Shinji Sasada**

### **Soichiro Takeyama**

Japan Electronics College

## Growth Rendering Device

---

Growth Rendering Device is a kinetic installation that records the growth of a pea plant over a 24-hour period. It displays a dialog among plant, environment, machine, and maker all working to thrive, to grow. David Bowen is an artist and assistant professor of sculpture and physical computing at the University of Minnesota Duluth. His work has been featured in exhibitions nationally and internationally.

### **David Bowen**

University of Minnesota Duluth

## Hylozoic Soil

---

Hylozoic Soil is a visually striking and multifaceted installation. Made up of a network of micro-controllers, proximity sensors, and shape-memory alloy actuators, this interactive environment draws the viewer into its shimmering depths. Philip Beesley is an artist, architect, and professor of architecture at the University of Waterloo. Hylozoic Soil was recently awarded first-prize honors at VIDA 11.0.

### **Philip Beesley**

University of Waterloo

## Mr. Lee Experiment

---

Mr. Lee Experiment is an interactive installation that allows the viewer to move human experimental subjects between different environments that can then be observed. In this work, humans have been reduced to the same status as other species, that of experimental subjects. Sanghun Lee, Jayoung Kim, Hyomi Mun, Jungmi Kim, and Junghwan Sung, all from the Media Department at SoongSil University, have created this work drawing on expertise across interactive media art, sound art, filmmaking, hardware and software design, and electronics.

**Sanghun Lee**  
**Jayoung Kim**  
**Hyomi Mun**  
**Jungmi Kim**  
**Junghwan Sung**  
Soongsil University

## MSOrgm (Motivational Sensitive Organism)

---

MSOrgm (Motivational Sensitive Organism) is a robot designed to interact with the viewer in a more personal and subtle way. This robot plant presents the viewer with restrained and graceful gestures, and collaborates with viewers' movements using cameras and facial recognition software. Scottie Huang is an artist and architect interested in tangible human-computer interfaces. Shen-Guan Shih is an associate professor in the Department of Architecture at National Taiwan University of Science and Technology.

**Scottie Chih-Chieh Huang**  
**Shen-Guan Shih**  
National Taiwan University of Science and Technology

## One

---

One is an interactive piece consisting of a single drop of ink in a suspended Petri dish and a large projection of the same drop. Viewer interaction with the suspended dish is the means of evolution for the animated ink blot. Yoon Chung Han is an artist and designer specializing in interactive media design. Gautam Rangan is an artist and designer creating animations for the Discovery Science channel. Erick Oh is an award-winning animation artist based in Los Angeles.

**Yoon Chung Han**  
**Gautam Rangan**  
UCLA Design | Media Arts

**Erick Oh**  
UCLA Department of Film, Television, and Digital Media

## Post Global Warming Survival Kit

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Post Global Warming Survival Kit is an installation that can only be experienced in infrared. In this post-apocalyptic world, viewers are invited to experience something that is at once bleak and beautiful, at a coastal outpost at land's end. Petko Dourmana is a media artist based in Sofia, Bulgaria. Post Global Warming Survival Kit was one of eight works nominated for a Transmediale 2009 Award.

**Petko Dourmana**

## TRANSDUCERS

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TRANSDUCERS is an installation composed of several glass tubes, each encasing a single human hair collected from different individuals. Triggered by the machinery, the human hair is stimulated to react, and the reaction is transduced into an audible output. Every audible result provides a technological interpretation of identity. Verena Friedrich is a German artist with a deep interest in science and technology. Shown internationally, her work has also been granted the \international\media\award\2005 for science and art from ZKM Karlsruhe.

**Verena Friedrich**  
University of Art and Design Offenbach

# GENERATIVE FABRICATION



## DAYS & HOURS

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

## LOCATION

Rooms 356

The SIGGRAPH 2009 Design & Computation Gallery explores non-linear and biological processes in design and digital fabrication through selected works of art, architecture, and design. The work's inherently generative nature encourages many lines of investigation along two main paths:

**Generative design** - algorithm and process, explorations of phase space and path-dependent emergent phenomena, form-making versus form-finding, and iterative design such as simulation, analysis, and optimization.

**Digital fabrication** - the interplay between digital representation and the crafting of physical objects; formation of structures by aggregation, weaving, and layered manufacturing; and exploitation of organic and composite material properties.

### Reception

#### Celebrating the Special Issue of Leonardo and SIGGRAPH 2009 Art & Design Galleries

Tuesday, 4 August, 1:30 - 3:30 pm  
Lobby outside Rooms 353-355

Drink a toast to the SIGGRAPH special issue of Leonardo and the SIGGRAPH 2009 art and design galleries. Talk with the artists, designers, and Art Papers authors about their work. Meet the members of the SIGGRAPH 2009 committee who organized this year's exhibits of digital art and design.

## Monumental Nets →→

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Sculpture that synthesizes traditional fabrication methods with digital form-finding to create monumental public sculptures.

**Janet Echelman**  
**Buro Happold**

Consulting Engineers

## Schiara Lantern →→

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A large, volumetric lantern made of translucent fiberglass composite panels formed on CNC-milled molds.

**Greg Lynn**  
Greg Lynn/FORM

**Bill Kreysler**  
Kreysler & Associates

## Complex Form in Timber →→

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Constructing free-form architecture in timber using parametric design and computer-controlled fabrication tools.

**Fabian Scheurer**  
designtoproduction

## Assemblages →→

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Architects pursuing design ideas based on Quasicrystals, forms that are rigorously modular yet grow wild.

**Chris Lasch**  
**Benjamin Aranda**

## MyLight.MGX →→

---

A family of lamp designs that are unique for each customer, made with rapid manufacturing techniques.

**Materialise.MGX**

## Holy Ghost →→

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A chair designed using genetic algorithms to determine modifications to the iconic Louis Ghost chair by Philippe Starck.

**Lionel Theodore Dean**

## Ground Substance →→

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A hybrid architectural design and biological research unit that demonstrates new modes of thinking in design and material construction.

**Sabin+Jones LabStudio**

## Pluripotent Structures →→

---

An investigation into adaptive and variable formal and structural organizations that have more than one possible outcome yet maintain coherence.

**Ferda Kolatan+Erich Schoenenberger**  
su11 architecture+design

# INFORMATION AESTHETICS SHOWCASE

## DAYS & HOURS

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

## LOCATION

Rooms 274-277

The emergent field of information aesthetics combines a rich variety of technical and artistic disciplines. Designers and new media artists are joining scientific visualization, informatics, and medical imaging specialists to create purposive, predictive, and creative representations of information. SIGGRAPH 2009 is highlighting this field in recognition of the increasingly prominent role that information visualization and data graphics are assuming in our digitally mediated culture.

The Information Aesthetics Showcase includes 2D and 3D prints, interactive and presentational screen-based works, multimodal installation environments, and physical objects that reveal information. In keeping with this year's theme, Networking the Senses, the works shown here engage not only the visual, but also auditory, kinesthetic, and tactile modalities. The relationship to information expressed in these exemplary pieces ranges from straightforward visualization of data to fanciful re-invention and transformation of it. Presenters include computational journalists, visual and material artists, biological researchers and neuro-scientists, graphic designers, scientific visualization developers, historians, cultural theorists, and digital media center collaborators.

### Related session:

#### Keynote Speaker

**Steve Duenes →***Graphics Director, New York Times*

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

La Nouvelle Orleans Ballroom

## 24X7@PHL:Vectoring

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24X7ATPHL:Vectoring is an investigation into a novel use of time-based animation software and procedural modeling as a method for visualizing time-based quantitative data via construction of a qualitative, two-dimensional rendering.

**Robert Trempe**

Temple University

## A\_B\_ peace & terror etc. The computational aesthetics of love & hate

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A geopolitical survey of the 192 member states of the United Nations that reveals the quantitative degree to which each contributes to peace and terror in the world.

**Peter Crnokrak**

The Luxury of Protest

## c-loc Software

---

Time-and-space-mapping software with which anyone can simultaneously visualize chronological and geographical data as three-dimensional graphics. It is suitable for people who want to investigate the relationship between time-and-space information in fields such as archeology, ethnology, and history.

**Yasushi Noguchi**

Tokyo Polytechnic University

**c-loc Software Project Team**

## Cultural Analytics Research Environment

---

Cultural Analytics is a new emerging field that uses data mining and interactive visualizations of large sets of cultural data in the humanities context. The presented projects demonstrate ideas behind the Cultural Analytics Research Environment, an open platform for cultural analytics research currently being constructed at the California Institute for Telecommunication and Information (Calit2) and the University of California, San Diego.

**Lev Manovich**

**Jeremy Douglass**

**Sergie Magdalin**

**Falko Kuester**

**So Yamaoko**

University of California, San Diego

## decibel 151

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decibel 151 is an art installation and a music interface that uses spatial audio technology and ideas of social networking to turn individuals into “walking soundtracks” as they move around each other in a shared real space and listen to each other in a shared virtual space.

**Michela Magas**

Goldsmiths, University of London

**Rebecca Stewart**

Queen Mary University of London

**Benjamin Fields**

Goldsmiths, University of London

## Height Restrictions

---

Height Restrictions uses procedural modeling as a tool for visualizing information about building size and density in Center City Philadelphia.

**Robert Trempe**

Temple University

## I'm Not There: Extending the Range of Human Senses to Benefit Wildlife Corridors

---

In an immersive environment, users experience extended senses of sight and sound in ways normally perceived only by other animals. This is a prototype for a real-time project intended to provide freedom to roam remote places with enhanced senses and, as a result, benefit wildlife corridors around the world.

**Carol LaFayette**

**Fred Parke**

**Philip Galanter**

**Ann McNamara**

Texas A&M University

## Katrina Project: NO-LA

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The Katrina Project: NO-LA involves collaborators from art, design, behavioral science, journalism, and community outreach. A database-driven, activist website explores the psychological and social effects of the storm and its aftermath through interviews with and works by filmmakers, artists, dancers, musicians, architects, and cooks in New Orleans and Los Angeles.

**Victoria Vesna**

**W.H. Lucas**

University of California, Los Angeles

**Claes Andersson**

Sveriges Radio

**Jay Yan**

University of California, Los Angeles

*Graduate Students*

**Kimberly Townes**

**Andreas Colubri**

**Estevan Carlos Benson**

*Undergraduate Students*

**Spring 2006 Print Class of W.H. Lucas**

**UCLA Center for Community Partnerships**

## Landmark Status

---

This study exposes the virtual connections of landmark buildings in Center City Philadelphia through a process of NURBS surface “pulling” and “contouring”, then extracting the information to display emergent patterns of tall building development.

**Robert Trempe**

Temple University

## MBTI Map (The)

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The MBTI map represents relationships among the words that describe people’s personalities using the methodology of knowledge visualization and subway lines as a metaphor.

**Seokhyun Jang**

Daum Communications

**Seonhee Kang**

**Joohee Bae**

**Suejean Ko**

**Jisu Lee**

**Kyungwon Lee**

Ajou University

## MSNBC Hurricane Tracker

---

Stamen worked with MSNBC to bring hurricane tracking data from the National Hurricane Center online in an interactive, visual form. The data include the past, present, and forecast location of storms, contours for areas affected by high wind speeds, and the probability of hurricane winds throughout the United States.

**Michal Migurski**

Stamen Design

## Multiscale Meta-Shape Grammar Objects for: ...a grain of sand turns the balance and ATLAS in silico

---

This aesthetically impelled work explores the use of n-dimensional glyphs generated by a custom meta-shape grammar algorithm to visually personify individual records from a massive metagenomics dataset comprised of 17.4 million sequences and places biological data in a human context to reflect upon the digitization of nature and culture.

**Ruth West**

University of California, Los Angeles

**JP Lewis**

Weta Digital

**Todd Margolis**

**Joachim Gossmann**

**Jurgen Schulze**

**Daniel Tenedorio**

**Rajvikram Singh**

University of California, San Diego

## News Knitter

---

News Knitter focuses on knitted garments as an alternative medium to visualize large scale data. Live news feed from the Internet that is broadcasted within 24 hours or a particular period is analyzed, filtered and converted into a unique visual pattern for a knitted sweater.

**Ebru Kurbak**

**Mahir M. Yavuz**

Universität für künstlerische und industrielle Gestaltung Linz

## Oakland Crimespotting

---

This tool for understanding crime in cities can inspire local governments to use data visualization for public release of many different kinds of data.

**Michal Migurski**

**Tom Carden**

Stamen Design

## OpenStreetMap 2008: A Year Of Edits

---

An animation that clearly shows, at planetary scale, the intensity and patterns of work by contributors to the wiki-style mapping project, OpenStreetMap.

**Hal Bertram**

ITO World Ltd.

## Out of Statistics: Beyond Legal

---

With an aesthetic approach, this project produces a series of abstract drawings as archival-ink digital prints on rice paper. The embedded images in this series are generated from US crime statistics using an algorithm developed from the artists' study of experimental hand drawings.

**Rebecca Ruige Xu**

Missouri State University

**Sean Hongsheng Zhai**

floatingcube.org

## Passing "Place for Games"

---

A high-resolution 3D art visualization that presents a detailed reconstruction of Kizhi, a world-famous Russian heritage site, developed using the latest concepts in real-time graphics, including complex illumination with dynamic-irradiance environment mapping, shadow mapping, and complex materials with normal and gloss mapping.

**Daria Tsoupikova**

University of Illinois at Chicago

**Robert Kooima**

Louisiana State University

## Rhythm Analysis; A Temporal Stereopsis of Urban Telecommunication Data Topography

---

This inspirational installation reveals a stereoscopic representation of temporal and spatial telecommunication data. It is an urban-communication indicator of 24 hours of everyday life in a central area of Seoul, created by transparent LED display sheets of conductive carbon nanotube.

**Eunju Han**

Royal College of Art

## Sky Oracle: Immersive Flowchart Representation for the Annexation of Tibet (The)

---

The Sky Oracle on the University of Florida's Second China Island in Second Life applies an interactive, immersive aesthetic to representation of structured information in the form of a control-flow diagram (a representation of both information and software).

**Paul Fishwick**

**Julie Henderson**

**Elinore Fresh**

**Rasha Kamhawi**

**Amy Jo Coffey**

University of Florida

**Benjamin Hamilton**

SAIC Corporation

## STOC: Stock Ticker Orbital Comparison

---

An interactive data visualization that uses the metaphor of a planetary system to map parameters of stocks in the S&P 500 to animated visual outputs.

**James Grant**

**Todd Spencer**

**Richard Armijo**

University of Advancing Technology

## 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

**William Forsythe**  
 The Forsythe Company

**Matthew Lewis, Beth Albright, Michael Andereck, Sucheta Bhatawadekar, Hyowon Ban, Andrew Calhoun, Jane Drozd, Joshua Fry, Melissa Quintanilha, Anna Reed, Benjamin Schroeder, Lily Skove, Ashley Thorndike, Mary Twohig, Ola Ahlqvist, Peter Chan, Noel Cressie, Stephen Turk**  
 The Ohio State University

**Jill Johnson, Christopher Roman, Elizabeth Waterhouse**  
 The Forsythe Company

**Scott deLahunta**  
 Amsterdam School of the Arts

**Patrick Haggard**  
 University College London

**Alva Noe**  
 University of California, Berkeley

## Touch the Invisibles

A novel interface that can superimpose tactile information onto images displayed on a computer monitor was used to produce an artwork on the subject of how humans perceive the real and digital world through the sense of touch.

**Junji Watanabe**  
 PRESTO Japan Science & Technology Agency

**Eisuke Kusachi**  
 Creator

**NOSIGNER (Eisuke Tachikawa)**  
 Designer

**Hideyuki Ando**  
 Osaka University

## Towards the Memory Tower

This digital installation explores the role of oscillatory brain network states in memory consolidation. The goal is to reconnect the science of the brain with the experiences that the brain engenders and to communicate complex neuroscientific understanding in a meaningful and stimulating way to a wider audience.

**Timothy Senior**  
 Duke University

## Visual Genealogy: Mr. Park, Myrang-Hwarok Clan

Visual genealogy reveals the cognitive meanings of a complex dataset. In this case, the data are life and death. The artwork shows a family tree of Mr. Park (Myrang clan, Hwarok party).

**Jin Wan Park**  
**Gyuwan Choe**  
 Chung-Ang University

## VisualPoetry - Generative Graphic Design for Poetry on the Road

VisualPoetry is a set of computer programs that generate the visuals for the literature festival Poetry on the Road. While the visual output is completely different every year, all visuals are based on the same concept: the programs turn poems into images.

**Boris Müller**  
 Fachhochschule Potsdam

**Florian Pfeffer**  
 one/one communication

## well-formed.eigenfactor: Visualizing Information Flow in Science

Interactive visualizations based on Eigenfactor Metrics and hierarchical clustering to explore emerging patterns in citation networks. A cooperation between the Eigenfactor Project (data analysis) and Moritz Stefaner (visualization).

**Moritz Stefaner**  
 Fachhochschule Potsdam

**Martin Rosvall**  
**Carl Bergstrom**  
 University of Washington, Seattle

# EMERGING TECHNOLOGIES



## DAYS & HOURS

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

## LOCATION

Rooms 337 - 342 & 346 - 351

SIGGRAPH 2009's Emerging Technologies presents innovative technologies and applications in many fields, including displays, robotics, input devices, and interaction techniques. The demos are available for attendees to try out and discuss with the creators.

Emerging Technologies includes a mix of works invited by the organizers and works selected from juried submissions to the SIGGRAPH 2009 online submission system.

Emerging Technologies abstracts are presented in the Full Conference DVD-ROM that Full Conference attendees receive with their registration.

## CATEGORIES

Rooms 337-339  
Room 340  
Rooms 341-342  
Rooms 346-347

**Input Interfaces**  
**Visualization**  
**Alternative Displays**  
**Experimental Sensory Experiences**

Room 348  
Room 349  
Rooms 350-351

**Robotics**  
**Audio Experiences**  
**Haptics and Virtual Reality**

## A Multimodal Floor for Virtual Environments

Rooms 350-351

Categories: Haptics and Virtual Reality

This interface is intended for immersive virtual-reality and augmented-reality environments in which users walk over “natural” ground surfaces such as snow and ice. To date, human-scale immersive environments that incorporate interactive floor surfaces have been predominantly focused on interactive presentation of visual and auditory display linked to a virtual-environment simulation. However, as we walk in natural environments, we receive continuous, multisensory information about the nature and composition of the ground surface – the crush of dry leaves under our feet, the soft compression of grass. The static nature of floor surfaces in existing virtual-environment simulations typically bears little resemblance to natural ground materials, and this creates a perceptual conflict with the dynamic visual and (when present) auditory feedback that users are typically provided in such an environment.

This project illustrates a novel approach to reconciling perceptual conflict, based on synchronous auditory, vibrotactile, and visual feedback provided through a floor surface in response to users’ steps. An array of force sensors in the floor and on-body motion capture acquires the movements of users. Multimodal feedback is generated in real time using physically motivated rendering models for the vibrotactile, auditory, and visual response of the respective virtual material to the steps of a user. This feedback is displayed responsively, at the site of each footstep, via an array of high-fidelity, low-cost vibrotactile and acoustic actuators embedded within the floor, in addition to top-down video projection. Potential future applications of this technology can be envisioned in areas such as immersive virtual-reality training simulations, responsive floor surfaces for entertainment parks, and interactive rehabilitation systems.

**Alvin Law**  
**Jessica Ip**  
**Benjamin Peck**  
**Yon Visell**  
**Paul Kry**  
**Jeremy Cooperstock**  
**Severin Smith**  
 McGill University

## A New Dual-Clickpad Remote Controller for Consumer Electronics

Room 340

Category: Visualization

Panasonic new Easy Touch Remote Controller provides tangible and intuitive interactions by means of sensor interpretation providing context recognition for out of the box experiences. These interaction experiences benefit from new Universal Design (UD) interaction concepts based on hand gestures and visual feedback.

The intelligent interpretation of multiple sensory information combined with powerful graphic capabilities of today consumer electronics allows the development of completely new user experiences. The Easy Touch Remote Controller features pointing capability and natural keyboard entry which relies on the dual touch-pad and holding style detection. In addition, indirect pointing, hand/hold/gesture recognition, orientation recognition and control with no-line of site using wireless technology allows the realization of natural and flexible interfaces for a wide variety of applications.

**Jean-Claude Junqua**  
**David Kryze**  
 Panasonic San Jose Laboratory

## AmbiKraf: An Embedded Non-Emissive and Fast-Changing Wearable Display

Room 341

Category: Alternative Displays

AmbiKraf is a novel non-emissive fabric display that combines the technologies of thermochromic ink with semiconductor heating and cooling to facilitate multicolor, fast-changing fabric displays. Merging of these two technologies creates revolutionary animated and interactive fabric displays. Key contributions are the robustness of the fabric display and a rapidly changing, multi-color capability.

Previous wearable displays are limited in practical usage due to their lack of robustness, high emissivity, one-way control, and slow color change. Emissive displays draw too much attention, and are obtrusive and distractive. Thermochromic inks, which are robust and practically usable over current non-emissive technologies, are used here with customized color-actuation temperatures optimized to suit the wearer’s comfort and the speed of color change. Thermochromic inks are mixed and screen printed onto the fabric, enabling easy implementation and a robust display. Light-weight semiconductor Peltier junctions intertwined into the fabric are used as temperature actuators, providing rapid heating and cooling on the same module. A matrix of Peltier modules is controlled with a tuned control circuit, introducing a novel form of fabric display that can show various animated sequences.

With this breakthrough combination of technology, the AmbiKraf demonstration ranges from simple calming animated displays to novel fashion-based interaction scenarios that enable bidirectional, display-based multimodal communication. The robust bidirectional control combined with high-speed color changing supersedes current non-emissive technologies, thus making AmbiKraf a more convincing and practical leap in wearable technology.

**Roshan Lalintha Peiris**  
**Adrian David Cheok**  
**James Keng Soon Teh**  
**Owen Noel Newton Fernando**  
**Andrea Wen Yingqian**  
**Andre Jiande Lim**  
**Pan Yi**  
**Doros Polydorou**  
 Keio-NUS CUTE Center

**Kian Peng Ong**  
 futuract

**Mili Tharakan**  
**Kris Hoogendoorn**  
 Keio-NUS CUTE Center

## An Interactive Retrographic Sensor for Touch, Texture and Shape

Room 337

Category: Input Interfaces

Retrographic sensing is a novel method for measuring surface texture and shape. It uses a sensor made of clear elastomer with a painted skin to non-destructively change an object's reflectance characteristics. When an object is pressed into the sensor, the painted skin conforms to the shape of the object. Viewed from behind, the object appears as a shaded surface, and the shape of the surface can be estimated using photometric stereo techniques. The resulting system can reconstruct high-resolution 2.5-D surface data at interactive rates.

**Micah Johnson**  
**Alvin Raj**  
**Edward Adelson**

Massachusetts Institute of Technology

## Anthropomorphization of a Space With Implemented Human-Like Features

Room 348

Category: Robotics

This anthropomorphization method uses human-like features like eyes and arms that are attached to the target. The anthropomorphized space can use gestures, pointing, emotion, and expression to initiate interaction. The method is easy to use, allows various representations, and extends the application of HCI studies.

With this method, it is possible to use metaphors for pointing to the location of an artifact. For example, when the printer is jammed, it can say: "I have a stomach ache". These metaphors would be impossible using an independent agent. This method also indirectly avoids the uncanny valley (strong repulsion between an industrial robot and a human) proposed by Mori. By using human-like features, we can verify separately what parts or actions of parts are positive and empathic for users and what parts or actions are negative. We can research anthropomorphization that is not uncanny by changing the humanoids' parts, without constraining the humanoid.

**Hirotaaka Osawa**  
Keio University

**Kentaro Ishii**  
Japan Science and Technology Agency, ERATO

**Toshihiro Osumi**  
**Ren Ohmura**  
**Michita Imai**  
Keio University

## Baby-Type Robot: YOTARO

Rooms 346-347

Category: Experimental Sensory Experiences

YOTARO is a new type of interactive robot that combines expressions, movements, and physiological characteristics. It displays a variety of emotions and reactions, such as smiling, crying, sleeping, anger, and sneezing. The robot is controlled by an emotion-control system based on inputs, such as touching, soft and warm facial expressions, or shaking a rattle. Reactions are displayed as voices, facial expressions, hand and leg movements, sniveling, and skin-color changes.

**Hiroki Kunimura**  
**Wagner Tetsuya Matsuzaki**  
**Masatada Muramoto**  
**Chiyoko Ono**  
**Madoka Hirai**  
**Toshiaki Uchiyama**  
**Kazuhiro Shiratori**  
**Junichi Hoshino**  
University of Tsukuba

## Back to the Mouth

Rooms 346-347

Category: Experimental Sensory Experiences

This interactive system uses mouth odor and breathing action to trigger events. The user aims a blowgun-type device (hose, IR camera, an air-flow sensor, and an odor sensor) to direct exhaled air toward a group of monsters that are affected by specific mouth odors. The user's breath odor is weakened or strengthened by drinking green tea or eating snacks.

In tests, many users have been amazed by the system. To defeat the monsters, some children have even learned to eat foods they dislike.

**Takuya Iwamoto**  
**Yusuke Sasayama**  
Kanazawa Institute of Technology

**Mitsuo Motoki**  
**Takayuki Kosaka**  
Kanazawa Technical

## Bloxels: Glowing Blocks as Volumetric Pixels

Room 342

Category: Alternative Displays

A Bloxel is a translucent cubical block that glows in full color and communicates with neighboring bloxels. Each bloxel obtains its color data from a lower bloxel through infrared high-speed flickers and transfers a series of color data to an upper bloxel. In this way, bloxels serve as volumetric pixels that can display meaningful content as a whole. This module-based approach introduces a ground-breaking display technology. Moreover, as an augmented version of children's block play, bloxels will have a significant impact in physical computing and tangible interfaces.

Bloxels features three technical innovations:

1. A bloxel consists of two full-color LEDs for display, nine infrared LEDs for data transmission, a photo detector, a battery, and a micro-controller. The infrared LEDs are placed so they can achieve data transmission even when neighboring bloxels are not completely in contact with each other.

2. The system's data-processing method enables a simple system configuration. Because each bloxel communicates only with neighboring bloxels, 3D sensors or cameras are not necessary to track their positions.

3. A horizontal tabletop display system sends signals to the base of the stacked bloxels. The specialized DLP projector can emit high-speed, flickering pixel-by-pixel signals to the base, which allows users to realize several kinds of applications.

Bloxels can be useful in educational and entertainment systems, as well as display technologies and human interfaces.

**Jinha Lee**  
The University of Tokyo

**Yasuaki Kakehi**  
Keio University

**Takeshi Naemura**  
The University of Tokyo

## CityMurmur

Room 340

Category: Visualization

The traditional topological forms of mapping and representing the city are becoming inadequate as new forces shape urban development. To meet these new needs, cartographers are building new maps based on co-extensive visions that define and visualize the city's physical and social networks. These new mapping activities not only describe quantitative data, but also create new narrative forms.

The CityMurmur project addresses this issue by sketching an image that shows the influence of media on the city. It describes information flows by linking them to physical geography. In addition to the noticeable city and the historic city, CityMurmur reveals a number of emerging cities shaped by invisible but real drivers. It depicts a city as seen by local media, full of places and events distributed over the territory; a city of international media, reduced to the crucial point of political and cultural activities; the cultural city and the sports city; and all the cities created by intersections of media traces. Each city is outlined by faint signals that are real and important when they are considered as a whole.

Online newspapers, information agencies, blogs, personal web sites, and thematic media are monitored to highlight the pattern of perceptions in the urban space. This monitoring activity leads to creation of an atlas that produces different maps based on news sources, themes, and time. The atlas allows users to understand the urban space as a function of the city's media attention, biases, and social and cultural diversity.

**Giorgio Caviglia**  
**Marco Quaggiotto**  
**Donato Ricci**  
**Gaia Scagnetti**  
**Michele Graffieti**  
**Samuel Granados Lopez**  
**Daniele Guido**

Writing Academic English

## CRISTAL: Control of Remotely Interfaced Systems Using Touch-Based Actions in Living Spaces

Rooms 338-339

Category: Input Interfaces

The number of digital appliances and media in domestic environments has risen drastically over the last decade. For example, living rooms now include digital TVs, DVD and Blu-ray players, digital picture frames, digital gaming systems, electronically moveable window blinds, and robotic vacuum cleaners. As these devices become more compatible with computer networking (for example, internet-ready TVs, streaming digital picture frames, and WiFi gaming systems, such as Nintendo's Wii and Sony's Playstation), and as wired and wireless network infrastructures become more prevalent in our homes, new opportunities arise for developing centralized control of these myriad devices and media into so called "universal remote controls". But many remote controls lack intuitive interfaces for mapping control functions to several devices, which leads to trial-and-error button pressing or experimentation with graphical user interface controls, instead of efficient interaction.

CRISTAL was developed to address this issue. It simplifies control of digital devices in and around the living room. The system provides a novel experience for controlling devices in a home environment by enabling users to directly interact with those devices on a live video image of the living room using multi-touch gestures on a digital tabletop.

**Thomas Seifried**  
**Christian Rendl**  
**Florian Perteneder**  
**Jakob Leitner**  
**Michael Haller**  
 Upper Austria University of Applied Sciences

**Daisuke Sakamoto**  
 JST ERATO Igarashi Design UI Project

**Jun Kato**  
 The University of Tokyo

**Masahiko Inami**  
 Keio University

**Stacey Scott**  
 University of Waterloo

## Crystal Zoetrope

Room 342

Category: Alternative Displays

The crystal zoetrope is a new visual medium that could make everyday objects more interactive and interesting. Traditional three-dimensional zoetropes generally consist of hundreds of physical-animation objects, each located at a particular position in space by means of physical supports. Consequently, most three-dimensional zoetropes have a complicated structure and tend to be bulky. This project employs the sub-surface laser engraving (SSLE) technique to directly engrave three-dimensional models into a crystal block and create a crystal zoetrope with a DC motor and 20 5W LEDs. Animation objects are embedded in a single crystal block that requires no supports, so even subtle 3D particle animations such as fog or stars can be produced without difficulty.

A miniaturized crystal zoetrope is embedded in a table with an acrylic board that assures a compelling image, thanks to the high luminance contrast between the inside and outside of the container. Viewers can intuitively control and enjoy the speed, direction, or brightness of the animation just by rubbing the surface of the table.

This new 3D-animation technique is equally applicable to other everyday objects or environments. Lighting, walls, floors, advertising, and toys could all be embedded with these zoetropes.

**Woohun Lee**  
**JinHa Seong**  
 Korea Advanced Institute of Science and Technology

## Digital Decal

Rooms 338-339

Category: Input Interfaces

This innovative interaction technique handles graphic images in a pen-based computing environment. With Digital Decal, ordinary paper replaces special decal films. Users simply place a sheet of paper printed with graphic images on the tablet screen and rub on it with a pen. The rubbed images are transferred directly to the screen in the same manner as a traditional decal.

Digital Decal is based on an elaborate mechanism for real-time cycles of scanning an image and painting on a tablet monitor. The prototype uses an optical-fiber bundle to transfer the image under the tip of the DecalPen to a color sensor. The sensor determines the average RGB values of the image and sends them to the computer. The position of the pen is monitored at intervals of 10 milliseconds. The computer then paints pixels in the detected color where the DecalPen is pointing.

DecalPen can be used as a medium of artistic expression as well as an intuitive user interface. Users can copy interesting graphic images to a screen intuitively by simple rubbing, and they can edit the images to express their feelings or ideas.

**Woohun Lee**  
**Geehyuk Lee**  
**Jiseok Song**  
**Boram Lee**  
**Hyunjung Kim**

Korea Advanced Institute of Science and Technology

## Embodied and Mediated Learning in SMALLab: A Student-Centered Mixed-Reality Environment

Rooms 338-339

Category: Input Interfaces

SMALLab is a mixed-reality learning environment that has reached over 35,000 students and educators in classrooms and museums across the country. It brings together emerging practices in human-computer interaction with contemporary research in the learning sciences. With 3D object tracking and real-time audio/visual and robotic feedback, the body serves as an expressive interface for learning experiences that are embodied, multimodal, and collaborative.

In this highly participatory demo, attendees experience a number of different learning scenarios drawn from physics, chemistry, earth science, english language learning, social wellness, and special education. These scenarios have been realized through an iterative co-design process that includes media researchers, classroom teachers, and curriculum specialists. The demo serves as a context for discussion of our research on mixed-reality technologies for learning. Recent studies demonstrate significant student learning gains and increases in teacher performance when SMALLab is used in a conventional classroom.

**David Birchfield**  
**Ellen Campana**  
**Sarah Hatton**  
**Mina Johnson-Glenberg**  
**Aisling Kelliher**  
**Christopher Martinez**  
**Loren Olson**  
**Philippos Savvides**  
**Lisa Tolentino**  
**Kelly Phillips**  
**Sibel Uysal**

Arizona State University

## Funbrella: Making Rain Fun

Rooms 346-347

Category: Experimental Sensory Experiences

Funbrella allows users to experience rain in distant places and different times. Generally, people experience rain in sounds, sights, and sometimes smells; this system exploits the vibration perceived through an umbrella's handle to let people feel the rain. The extremely simple vibration structure is based on a speaker and a microphone, which record and provide vibrations.

The demo presents two applications:

1. Crazy Rain. In this scenario, Funbrella stores many types of rain in advance, including not only normal rain with three levels of strength, but also odd rains such as water from a bucket and "rains" recorded with snake toys, marbles, BBs, and spaghetti. In this application, participants experience impossible or unlikely rains.
2. Tele-Rain, in which two participants hold Funbrellas apart from each other, and one's rain is transmitted to the other in real time.

**Ai Yoshida**  
**Yuichi Itoh**  
**Kazuyuki Fujita**  
**Maya Ozaki**  
**Tetsuya Kikukawa**  
**Ryo Fukazawa**  
**Yoshifumi Kitamura**  
**Fumio Kishino**  
Osaka University

## gCubik: Real-Time Integral Image Rendering for a Cubic 3D Display

Room 342

Category: Alternative Displays

gCubik provides a shared, interactive 3D visual experience in graspable cubic display. Users view color, stereo, and full-motion parallax 3D scenes, viewable from any direction, without special glasses. The autostereoscopic effect is delivered by newly designed wide-field-of-view integral photography lens arrays on each face of the display. In this demonstration, real-time rendering of the IP images allows users to interactively manipulate the 3D objects in the scene with simple finger gestures.

**Roberto Lopez-Gulliver**

**Shunsuke Yoshida**

**Sumio Yano**

**Naomi Inoue**

**Mao Makino**

National Institute of Information and Communications Technology

## Graphical Instruction for a Garment-Folding Robot

Room 348

Category: Robotics

An interactive graphical editing interface that tells intelligent robots how to complete tasks in dynamic environments. Although natural language has often been considered the ideal communication method for robots, it lacks efficiency in specifying tasks that require visual (geometric) information. Likewise, learning from demonstration can be useful for robots, but such methods are often too complex to be generalized for any system.

This project demonstrates a specialized graphical editor that allows the user to abstract and specify instructions for a robot by performing simple editing operations (clicking and dragging) through the interface. For example, a robot can be taught to fold garments. The demonstration shows that this approach is particularly effective for allowing end-users to customize a robot's behavior according to their particular needs, which cannot be conveyed by a single, pre-programmed solution for a general audience.

**Yuta Sugiura**

Keio University/JST, ERATO

**Takeo Igarashi**

The University of Tokyo/JST, ERATO

**Hiroki Takahashi**

Waseda University/JST, ERATO

**Tabare Akim Gowon**

Harvard University/JST, ERATO

**Charith Lasantha Fernando**

**Maki Sugimoto**

**Masahiko Inami**

Keio University/JST, ERATO

## HeadSPIN: A One-to-Many 3D Video Teleconferencing System

Room 341

Category: Alternative Displays

Our 3D teleconferencing system enables true eye contact between a three-dimensionally transmitted subject and multiple participants in an audience. The subject's face is scanned in 3D at 30 feet per second and transmitted in real time to a horizontal-parallax-only 3D display. The display uses a rapidly spinning mirror surface to reproject a life-size 3D view of the subject's face. This dynamic 3D face is visible over a wide 180-degree field of view by multiple audience members simultaneously without any 3D glasses. The subject can then turn to face and talk to any audience member.

To achieve two-way eye contact, the system captures 2D video from a cross-polarized camera reflected to the position of the displayed subject's eyes. Then it displays this 2D video feed on a large screen in front of the person being scanned, replicating the viewpoint of the person's virtual self. This image is used to interactively track the position of the eyes of all of the observers in the scene, allowing the 3D display to create the correct vertical perspective for each of the viewers around the device. The result is a one-to-many 3D teleconferencing system that can reproduce the effects of gaze, attention, and eye contact often missed in traditional teleconferencing systems.

**Andrew Jones**

**Magnus Lang**

**Graham Fyffe**

**Xueming Yu**

**Jay Busch**

University of Southern California,  
Institute for Creative Technologies

**Ian McDowall**

Fakespace Labs

**Mark Bolas**

University of Southern California,  
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& School of Cinematic Arts

**Paul Debevec**

University of Southern California,  
Institute for Creative Technologies

## ILoveSketch

Rooms 338-339

Category: Input Interfaces

ILoveSketch is a 3D curve-sketching system that captures some of the affordances of pen and paper for professional designers, allowing them to directly alter conceptual 3D curve models. The system coherently integrates existing techniques of sketch-based interaction with a number of new and enhanced features. Novel contributions of the system include automatic view rotation to improve curve sketchability, an axis widget for sketch surface selection, and implicitly inferred changes between sketching techniques. It also improves on a number of existing ideas such as a virtual sketchbook, simplified 2D and 3D view navigation, multi-stroke NURBS curve creation, and a cohesive gesture vocabulary.

**Seok-Hyung Bae**  
**Ravin Balakrishnan**  
**Karan Singh**  
University of Toronto

## Interactive Cooking Simulator

Rooms 346-347

Category: Experimental Sensory Experiences

Interactive Cooking Simulator uses visual information from the physical and chemical changes that occur during the cooking process to help users understand theoretical operations. In real cooking, we cannot sense the effects of cooking in real time. For example, temperatures inside the food ingredients cannot be monitored even with a thermography camera. But the Interactive Cooking Simulator can simulate states inside and outside the ingredients, including heat and moisture

The system consists of three major elements:

1. 3D shape model and dynamic simulation, which simulates the dynamics of food ingredients as they are turned in the frying pan.
2. Heat, moisture, and chemical-reaction simulation expressed using the finite-element method.
3. Haptic interaction.

With this system, users observe what happens during cooking, apply this understanding to improve cooking skills, and learn that anyone can enjoy cooking.

**Fumihiro Kato**  
**Yusuke Hanaoka**  
**Tu Nguyen Ngoc**  
**Daniel Keoki**  
The University of Electro-Communications

**Hironori Mitake**  
**Takafumi Aoki**  
Tokyo Institute of Technology

**Shoichi Hasegawa**  
The University of Electro-Communications

## Jhai Sustainable Telemedicine Solution

Room 340

Category: Visualization

Jhai supports sustainable telemedicine in remote villages in India and Laos. It works off-grid, at low bandwidth, at low cost. It is an integrated solution that includes business templates, hardware, software, and training. The organizers have co-created 70 businesses in Laos, and they have received requests from 60 countries.

**Lee Thorn**  
Jhai Foundation

**Rajeev Kumar**  
Neurosynaptic Communications Pvt Ltd

**Mark Allen**  
Jhai Foundation

## Pen de Touch

Rooms 350-351

Categories: Haptics and Virtual Reality

Pen de Touch is a pen-shaped handheld device for haptic interactions with virtual environments. Unlike conventional haptic displays, which provide vibrations that do not effectively represent actual sensations, this device provides kinesthetic sensations to the user's fingers, and the user's movements are not restricted by mechanical linkages.

Development of an ungrounded haptic display that can provide continual kinesthetic sensations has not been reported previously. Pen de Touch is based on the novel hypothesis that the kinesthetic sensations felt at the user's fingers are sufficient to provide touch sensations of touch, which allows the device to be relatively small. When a user holds the device, the base is fixed to the index finger, which is inserted in a ring, and the index finger, middle finger, and thumb grasp the grip. When the tip of the device touches a virtual object, the grip is pulled back toward the base by three motors installed in the base, generating kinesthetic sensations on the skin and muscles of the fingers.

The simplicity and representational ability of Pen de Touch make it suitable for various kinds of conventional virtual-reality systems without haptic augmentation. It will soon be applied to haptically augmented interactions for multiple users in public domains such as museums.

**Sho Kamuro**

**Kouta Minamizawa**

**Naoki Kawakami**

The University of Tokyo

**Susumu Tachi**

Keio University

## PhotoelasticTouch: Transparent Rubbery Interface Using an LCD and Photoelasticity

Room 342

Category: Alternative Displays

PhotoelasticTouch is a tabletop system designed to facilitate touch-based interaction with real objects made from transparent elastic material. The elastic material provides a realistic haptic interface, which when combined with the visual content displayed on the LCD tabletop, enables a coupling of the physical world and digital content. The system utilizes the photoelastic properties of transparent rubber to detect when a user pushes, pulls, or pinches the object, while the LCD provides appropriate visual feedback in accordance with the stress applied to the rubber.

The technical contribution of this work is the use of the transparent photoelastic material to detect stress applied to tangible objects on the LCD. Previous force-sensitive rubbery interfaces require special markers to be embedded inside the elastic material, which impose restrictions on the shape of the object. PhotoelasticTouch does not require any markers and does not place any restrictions on the shape of the object. Therefore, the proposed system enables intuitive haptic interfaces for various interactive applications like video games and digital signage using a free-form tangible interface.

PhotoelasticTouch is composed of an LCD and an overhead camera, both fitted with a quarter-wavelength filter. When a user applies pressure to the elastic material on the LCD by pinching or pushing, the deformed area transforms incoming light into elliptically polarized light that is captured as a high-intensity region by the camera. The orientation and power of the force can be calculated by monitoring the position and size of the high-intensity region.

We have developed an entertainment application using a transparent elastic face. The user can interact with the 2.5-dimensional face model by (for example) pinching the cheek or squeezing the nose. In response to these inputs, the system displays changes in facial expression.

**Toshiki Sato**

**Haruko Mamiya**

**Taro Tokui**

**Hideki Koike**

The University of Electro-Communications

**Kentaro Fukuchi**

Japan Science and Technology Agency

## Pull-Navi

Rooms 346-347

Category: Experimental Sensory Experiences

This new interface for walking navigation pulls users' ears. The system is composed of two clips attached to the earlobes, six DC motors to pull each ear in three directions, and a helmet that holds the motors. In experimental sessions, users were inevitably tempted to move right or left when their ears were pulled to the right or left. When both ears were pulled forward or backward, the users were tempted to walk faster or slower. Interestingly, when both ears were pulled up or down, the users were tempted to walk up or down stairs if stairs were available.

Pull-Navi has three advantages compared to previous walking-navigation systems:

1. It is more natural. The ear-pulling interface is quite small force, and users moved in the guided direction without any pain or enforced feelings. This is presumably because our ears were pulled for navigation when we were young.
2. Numerous degrees of freedom. While most previous tactile navigation systems achieved at most two-DOF navigation, our new interface can direct full three-DOF movements (right, left, front, back, up, and down). This feature is quite useful for indoor situations, such as navigation in a complex department store moving through a subway station.
3. Compact architecture. The system uses small, lightweight motors to pull the ears, and further miniaturization is easy. A prototype mounted on eyeglasses has already been developed.

Many tactile navigation systems have been developed, but, except for a few devices used by visually handicapped people, none of them is practical. Pull-Navi is designed to be the first successful tactile walking-guidance system.

**Yuichiro Kojima**

**Yuki Hashimoto**

**Shogo Fukushima**

**Hiroyuki Kajimoto**

The University of Electro-Communications

## SCOPE

### Room 337

#### Category: Input Interfaces

SCOPE gives traditional games a second chance, via augmented reality. Thanks to SCOPE, players have access to various functions (power, life, magic, experience, attack, etc.) and virtual accessories (weapons, tools, protection) that are commonly found in video games. Using tangible toys (figurines, robots) and equipped with head-mounted displays, players operate in a real place with accessories from their own toy boxes. However, thanks to augmented reality, they can also work with virtual elements that they do not tangibly possess. The objective of this project is to create an imaginative and engrossing environment, while creating value for old discarded toys.

**Frantz Lasorne**

## Scratch Input

### Rooms 338-339

#### Category: Input Interfaces

When this simple sensor is incorporated into mobile devices, it allows any suitable surface to be appropriated for gestural finger input, opening many new interaction possibilities.

Scratch Input is the first acoustic-based input system that seeks to appropriate common surfaces for input. The technique is highly mobile, appropriating surfaces wherever the user happens to go and demonstrating that not all input devices have to be special purpose, but instead can be co-opted from the environment.

The sensor is inexpensive and may provide a feasible path to truly ubiquitous finger input on mobile devices or home and office walls.

**Chris Harrison**

**Scott Hudson**

**Julia Schwarz**

Carnegie Mellon University

## Sound Scope Headphones

### Room 349

#### Category: Audio Experiences

Sound Scope Headphones let users control an audio mixer with natural movements. When listening to music, listeners sometimes want to hear particular parts more clearly or reduce the volume of other parts. This is possible with commercial audio mixers that perform multi-channel recording and mix-downs. But commercial audio mixers are too complicated for musical novices.

This device controls an audio mixer with three sensors: a digital compass, a tilt sensor, and a distance sensor. The sensors, mounted on the headphones, detect natural movements of the head or a hand placed behind an ear when the user is listening to music.

Previous headphones with sensors that detect the direction the user is facing or the location of the head can intensify musical presence and create a realistic impression, but they do not control the volumes and panpots of each part. Sound Scope Headphones allow a listener to scope a particular portion of music. For example, when listening to jazz, you might want to clearly hear the guitar or reduce the sound of the sax. By moving your head left or right, you can hear the music from a frontal position. By looking up or down, you can better hear the parts allocated to a more distant or near position. By simply putting your hand behind your ear, you can adjust the distance sensor and focus on a particular part you want to hear.

**Masatoshi Hamanaka**

**SeungHee Lee**

University of Tsukuba

## Texmoca

### Room 342

#### Category: Alternative Displays

Texmoca is a texture-pattern generation system that uses real smoke. It uses the properties of the convection phenomena to generate variable geometrical patterns.

Nichrome heaters arranged like a matrix generate smoke. A laser sheet shows a cross section of smoke generated by the heaters converge at the top of the device. Because many particles of smoke gather in at the top, more laser light is reflected there, and viewers can see a geometrical, linear image derived from shining troughs.

The position of the troughs can be changed by the thermal-energy balance of the heaters, which is controlled by software. This patterned-generation algorithm is similar to the Voronoi diagram in computational geometry (a unique characteristic compared to other patterned smoke generators). Though the system's geometrical trough pattern is programmable, the fluctuation of the smoke texture is concentrated where the convection energy becomes weak. So the system offers users both the enjoyment of recognizing the designed pattern and the pleasure of perceiving the fluctuating smoke texture.

This system could be applied to interior and display design. Using special-application software for pattern composition, designers could use the "smoke composer" to easily unite a unique pattern sequence and design their own "music of smoke".

This project is sponsored by CREST (JST).

**Masato Sekine**

**Kyoko Kuroda**

**Tatsuma Segawa**

**Hiroya Tanaka**

Keio University

## The Sleighing Simulator 2.0

Room 346-347

Category: Experimental Sensory Experiences

Sensation of speed is one of the important factors in designing enjoyable entertainment systems such as motion rides. Motion platforms display a sense of acceleration, but visual information is essential for delivering an overall sense of speed. This prototype system uses LED-matrix arrays in a peripheral visual display that augments speed sensation. It consists of a sleigh-like input device, a conventional display in front of the user, and the peripheral display, which enhances users' sense of speed.

**Yu Okano**

**Hiroyuki Kajimoto**

**Takuya Nojima**

The University of Electro-Communications

## The UnMousePad: The Future of Touch Sensing

Room 338-339

Category: Input Interfaces

The UnMousePad is a flexible and inexpensive multi-touch input sensor based on a novel principle: interpolating force-sensitive resistance (IFSR). IFSR devices can acquire high-quality, anti-aliased images of pressure over a surface at high frame rates. This new touch-sensing technology has a wide range of potential applications in many sectors of society, because it enables multi-touch pressure imaging at low cost in a wide variety of form factors.

This demo shows various form factors and applications of IFSR sensors, ranging from uses in portable electronic devices, electronic paper, and desktop computing environments to applications in musical instruments, gaming, and entertainment. The goal is to inspire thinking about what the world would be like if common everyday objects were augmented with the ability to capture the subtleties of human touch.

**Ilya Rosenberg**

**Ken Perlin**

**Charles Hendee**

**Alexander Grau**

**Nadim Awad**

**Adrian Secord**

**Merve Keles**

New York University

**Christian Miller**

University of Texas at Austin

**Julien Beguin**

Gotham Wave Games

## Touchable Holography

Room 350-351

Categories: Haptics and Virtual Reality

Recently, mid-air displays are attracting a lot of attention in the fields of digital signage and home TV, and many types of holographic displays have been proposed and developed. Although we can "see" holographic images as if they are really floating in front of us, we cannot "touch" them, because they are nothing but light.

This project adds tactile feedback to the hovering image in 3D free space. Tactile sensation requires contact with objects, but including a stimulator in the work space dilutes the appearance of holographic images. The Airborne Ultrasound Tactile Display solves this problem by producing tactile sensation on a user's hand without any direct contact and without diluting the quality of the holographic projection.

**Takayuki Hoshi**

**Masafumi Takahashi**

**Kei Nakatsuma**

**Hiroyuki Shinoda**

The University of Tokyo

## Twinkle: Interface for Using Handheld Projectors to Interact with Physical Surfaces

Room 349

Category: Audio Experiences

Twinkle is a novel interface for interaction with an arbitrary physical surface using handheld projectors. It determines the features of the physical environment and displays images and sounds that are generated according to these features.

The system enables various applications. One example: an interface for music composition and musical performance. The pitch of a sound is determined by the size of the object illuminated by the projector. The color of the object and the user's motion determine the tone and the volume, respectively, of the sound. Users can create melody and rhythm by laying out objects on a surface. This interface enables users to compose and play music based on intuition, without any knowledge of music theory.

The system is composed of a handheld projector and a camera fixed to the projector. It is quite simple and does not need other motion-tracking systems. The camera has two roles: to estimate the user's motion and to recognize the features of the physical surface, which allows it to calculate the projector's position relative to the surface and the distance between the projector and the surface. An optical-flow technique enables estimation of the direction and velocity of the user's hand motion on a two-dimensional surface. Various existing image-processing methods can be used to recognize the features of the physical surface.

**Takumi Yoshida**

The University of Tokyo

**Hideaki Nii**

Keio University

**Naoki Kawakami**

The University of Tokyo

**Susumu Tachi**

Keio University

## Versatile Training Field: the Wellness Entertainment System Using Trampoline Interface

Rooms 338-339

Category: Input Interfaces

The Versatile Training Field (VTF) is based on the wellness concept: "Change a lifestyle habit and live life to the fullest". The system is composed of an input device and a PC, a short-focus projector, and two large-scale screens. The input device consists of a mini trampoline and a position-sensitive-detector beneath the center of the trampoline, which measures change on the trampoline bed. When the system detects the type and state of the exercise and calculates the viewpoint of the user in VR space, the short-focus projector displays the view on large screens in front of and below the user. Users see themselves exercising in virtual reality.

**Hiroshi Mori**  
**Kazuhito Shiratori**  
**Tomoyuki Fujieda**  
**Jun'ichi Hoshino**  
 University of Tsukuba

## Virtualization Gate

Rooms 350-351

Categories: Haptics and Virtual Reality

This project associates multi-camera 3D modeling, physical simulation, and tracked head-mounted displays for a strong full-body immersion and presence in virtual worlds. Three-dimensional modeling is based on the EPHV algorithm, which provides an exact geometrical surface according to input data. The geometry enables computation of full-body collisions with virtual objects animated by a physical simulation. Since the algorithm is exact, it allows for consistent texture mapping and yields qualitative models. This full-body representation can thus be rendered on a distant site for telepresence. It can also be rendered into a HMD.

Users see their 3D models superposed with their real bodies occluded by the HMD. Since the displays are held in front of the eyes, the image projection is not impaired by elements of the real world. With a fixed screen, even in an immersive Cave-like configuration, users would not be able to see a virtual object in their palms, because their hands would occlude the light emitted by the displays. With our approach, users see the 3D model of their hands and the virtual object correctly positioned in their palms. It enables a first-person viewing and occlusion-free, co-located interactions. The 3D modeling system makes no assumption about the scene observed. One or several persons can stand in the acquisition space. The number of persons only affects the model quality and the computation time.

We presented a similar concept, the Grimage platform, in SIGGRAPH 2007 Emerging Technologies. But the acquisition space was limited to a small volume for modeling the user's hands, and images were rendered on a fixed screen positioned behind the acquisition space, providing little immersion and only third-person interactions.

**Benjamin Petit**  
**Thomas Dupeux**  
 INRIA

**Jean-Denis Lesage**  
 Grenoble Universités

**Hervé Mathieu**  
 INRIA

**Edmond Boyer**  
 Grenoble Universités

**Bruno Raffin**  
 INRIA

**François Faure**  
 Grenoble Universités

**Clément Ménier**  
**Florian Geffray**  
 4D View Solutions

**Laurence Boissieux**  
**Michaël Adam**  
**Florent Falipou**  
 INRIA

**Richard Broadbridge**  
 4D View Solutions

## POSTER VIEWING

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

## POSTER SESSIONS

An opportunity for authors to meet with attendees.

Tuesday, 4 August	12:15 - 1:15 pm
Thursday, 6 August	12:15 - 1:15 pm

## LOCATION

Auditorium Lobby



Posters offer a light-weight, low-tech method for presenting student, in-progress, and late-breaking work. They are displayed throughout the conference week for attendees to browse at their leisure. Poster topics range from applications of computer graphics to novel interactive techniques to in-depth research on specific topics. Posters also present work submitted to the ACM Student Research Competition.

## POSTER CATEGORIES

### ACM STUDENT RESEARCH COMPETITION SEMI-FINALIST

1A - 13A

### ANIMATION

15A - 21A

### ART

22A - 24A

### HARDWARE

25A - 27A

### HUMAN COMPUTER INTERACTION

28A - 30A

### IMAGE & VIDEO PROCESSING

31A - 36B

### INTERACTION

37A - 45A

### MODELING

46A - 52A

### MUSIC

53A - 54A

### PHYSICS SIMULATION

55A - 57A

### RENDERING

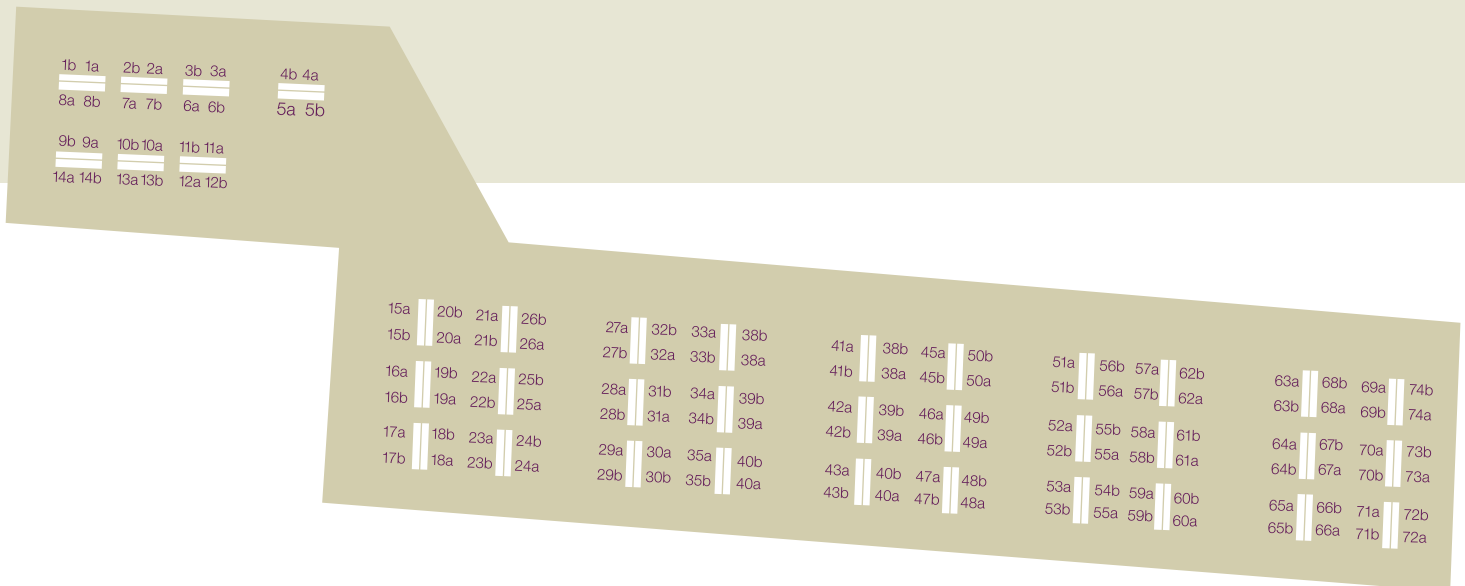
58A - 65A

### SCIENTIFIC VISUALIZATION

66A - 67B

### VIRTUAL REALITY/AUGMENTED REALITY

68A - 71B



## Animation

### 15A. Animating Character Images in 3D Space

**Bing-Yu Chen, Shih-Chiang Dai**  
National Taiwan University

**Shuen-Huei Guan**  
Digimax

**Tomoyuki Nishita**  
The University of Tokyo

### 15B. Animating Lip-Sync Speech Faces by Dominated Animeme Models

**Fu-Chung Huang**  
University of California, Berkeley

**Yu-Mei Chen, Tse-Hsien Wang, Bing-Yu Chen**  
National Taiwan University

**Shuen-Huei Guan**  
Digimax

### 16A. CG Animation for Piano Performance

**Nozomi Kugimoto, Kota Takai, Rui Miyazono, Kosuke Omori, Takeshi Fujimura, Shinichi Furuya, Haruhiro Katayose, Hiroyoshi Miwa, Noriko Nagata**  
Kwansei Gakuin University

### 16B. Characteristic Gait-Animation Synthesis From Single-View Silhouette

**Shinsuke Nakamura, Masashi Shiraishi, Shigeo Morishima**  
Waseda University

**Mayu Okumura, Yasushi Makihara, Yasushi Yagi**  
Osaka University

### 17A. Extraction of Characteristic Postures in a Dance by Statistical Analysis of a Database of Motion Data

**Takeshi Miura, Kazutaka Mitobe**  
Akita University

**Takaaki Kaiga**  
Digital Art Factory, Warabi-za Co., Ltd.

**Takashi Yukawa**  
North Asia University

**Toshiyuki Taniguchi, Hideo Tamamoto**  
Akita University

### 17B. Directable Anime-Like Shadow Based on Water-Mapping Filter

**Yohei Shimotori, Shiori Sugimoto, Shigeo Morishima**  
Waseda University

### 18A. Expressive Facial Subspace Construction From Key Face Selection

**Ryo Takamizawa, Takanori Suzuki, Hiroyuki Kubo, Akinobu Maejima, Shigeo Morishima**  
Waseda University

### 18B. Model-Based Synthesis of Visual Speech Movements From 3D Video

**James Edge, Adrian Hilton, Philip Jackson**  
The University of Surrey

### 19A. Muscle-Based Facial Animation Considering Fat-Layer Structure Captured by MRI

**Hiroto Yarimizu, Yasushi Ishibashi, Hiroyuki Kubo, Akinobu Maejima, Shigeo Morishima**  
Waseda University

### 19B. Pliant Motion: Integration of Virtual Trajectory Control into LCP Based Physics Engines

**Takashi Tokizaki, Shoichi Hasegawa**  
The University of Electro-Communications

### 20A. Polygonal Functional Hybrids for Computer Animation and Games

**Denis Kravtsov, Oleg Fryazinov, Valery Adzhiev, Alexander Pasko, Peter Comninos**  
NCCA, Bournemouth University

### 20B. Retrieval of Motion-Capture Data Based on Short-Term Feature Extraction

**Jianfeng Xu, Haruhisa Kato, Akio Yoneyama**  
KDDI R&D Laboratories Inc.

### 21A. Story Engine for Interactive Characters

**Katsutoki Hamana, Hiroshi Mori, Atsushi Nakano, Junichi Hoshino**  
University of Tsukuba

## Art

### 22A. GreenLite Dartmouth: Unplug or the Polar Bear Gets It

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

### 22B. H-LINK 3D: Hyper-Learning Interface and Navigation Kit in 3D Virtual Worlds

**Saba Kawas**  
North Carolina State University

### 23A. Himawari: A Plant Robot

**Akira Nakayasu, Kiyoshi Tomimatsu**  
Kyushu University

### 23B. IArtist: A Self-Learning Computer Artist

**Benjamin Raynal**  
Institut d'electronique et d'informatique Gaspard-Monge  
Université Paris Est Marne-la-Vallée

**Xavier Gouchet**  
French Algorists

**Vincent Nozick, Venceslas Biri**  
Institut d'electronique et d'informatique Gaspard-Monge  
Université Paris Est Marne-la-Vallée

### 24A. Thermotaxis

**Takuji Narumi**  
The University of Tokyo

**Akagawa Tomohiro**  
Tokyo University of the Arts

**Young Ah Seong, Michitaka Hirose**  
The University of Tokyo

## Hardware

### 25A. Adaptive Coded Aperture Projection

**Max Grosse**  
Bauhaus-Universität Weimar

**Gordon Wetzstein**  
University of British Columbia

**Anselm Grundhoefer, Oliver Bimber**  
Bauhaus-Universität Weimar

### 25B. Mobile Tagging & Mixed Realities

**Martha Gabriel**  
Universidade de São Paulo /Centro  
Universitário Belas Artes de São Paulo

### 26A. Rendering of Vector Objects on Curved Surface Using Pivot Triangle Primitives

**Norihiro Nakamura, Yoshiyuki Kokojima, Yasunobu Yamauchi**  
Toshiba Corporation Research & Development Center

### 26B. Three-Dimensional Auto-Stereoscopic Animated Image With a Long Viewing Distance Using High-Precision Image Correction

**Takehito Teraguchi, Hiromasa Yamashita, Ken Masamune, Takeyoshi Dohi, Hongen Liao**  
The University of Tokyo

### 27A. The UnMousePad – The Future of Touch Sensing

**Ilya Rosenberg, Ken Perlin, Charles Hendee, Alexander Grau, Nadim Awad, Adrian Secord, Merve Keles**  
New York University

**Christian Miller**  
University of Texas at Austin

**Julien Beguin**  
Gotham Wave Games, Inc.

## Human Computer Interaction

### 28A. A Saccade-Contingent Display for Suppressing Color Breakup

**Wei-Chung Cheng**  
National Chiao Tung University

**Jih-Fon Huang**  
Industrial Technology Research Institute

### 28B. Mobile-Screen Transition Animations

**Jussi Huhtala**  
**Ari-Heikki Sarjanoja**  
Nokia Research Center

**Jani Mäntyjärvi**  
Technical Research Centre of Finland

**Minna Isomursu**  
**Jonna Häkkinen**  
Nokia Research Center

### 29A. rAir Flow Menus: Toward Reliable 3D Gestural Input For Radial Marking Menus

**Danny Rado**  
University of Minnesota

### 29B. Thermo-Pict

**Kensuke Takada**  
**Kyoko Higurashi**  
**Tatsuhiko Suzuki**  
**Misako Ota**  
**Tetsuaki Baba**  
**Kumiko Kushiya**  
Tokyo Metropolitan University

### 30A. Using Eye Tracking to Analyze Stereoscopic Filmmaking

**Celambarasan Ramasamy**  
**Donald House**  
**Andrew Duchowski**  
**Brian Daugherty**  
Clemson University

## Image & Video Processing

### 31A. 3D-Model-Based Face Replacement in Video

**Yi-Ting Cheng**  
**Virginia Tzeng**  
**Yu Liang**  
National Taiwan University

**Chuan-Chang Wang**  
Next Media Animation Limited

**Bing-Yu Chen**  
**Yung-Yu Chuang**  
**Ming Ouhyoung**  
National Taiwan University

### 31B. A Comparison of Three Methods of Face Recognition for Home Photos

**Che-Hua Yeh**  
**Pei-Ruu Shih**  
**Kuan-Ting Liu**  
**Yin-Tzu Lin**  
**Huang-Ming Chang**  
**Ouhyoung Ming**  
National Taiwan University

### 32A. Augmenting a Camera With a Thermometer

**Joern Loviscach**  
Fachhochschule Bielefeld

### 32B. Automatic Colorization of Grayscale Images Using Multiple Images on the Web

**Yuji Morimoto**  
**Yuichi Taguchi**  
**Takeshi Naemura**  
The University of Tokyo

### 33A. Data-Driven Diffuse-Specular Separation of Spherical Gradient Illumination

**Tongbo Chen**  
**Abhijeet Ghosh**  
**Paul Debevec**  
University of Southern California,  
Institute for Creative Technologies

### 33B. Deblurring With Rank-Structured Inverse Approximations

**Mary Hudachek-Buswell**  
**Catherine Matos**  
Clayton State University

**Michael Stewart**  
Georgia State University

### 34A. Image-Based DressUp System

**Nari Kim**  
**Jong-Chul Yoon**  
**In-Kwon Lee**  
Yonsei University

### 34B. Image Panoramic System for Mobile Devices

**Yingen Xiong**  
**Xianglin Wang**  
**Marius Tico**  
**Chia-Kai Liang**  
**Kari Pulli**  
Nokia Research Center

### 35A. Proportional Constraint for Seam Carving

**Kei Utsugi**  
**Takuma Shibahara**  
**Takafumi Koike**  
Hitachi Ltd.

**Takeshi Naemura**  
University of Tokyo

### 35B. Ray Tracing to get 3D Fixations on VOIs From Portable Eye Tracker Videos

**Susan Munn**  
**Jeff Pelz**  
Rochester Institute of Technology

### 36A. Uniform Looking Vector Plot With Streamline Fragmentation

**Naoki Kawai**  
Dai Nippon Printing Co., Ltd.

### 36B. Video Segmentation With Motion Smoothness

**Chung-Lin Wen**  
**Yu-Ting Wong**  
**Bing-Yu Chen**  
National Taiwan University

**Youchi Sato**  
The University of Tokyo

## Interaction

### 37A. A Random Cursor Matrix to Hide Graphical Passwords

**Alice Boit**  
Universität Potsdam

**Thomas Geimer**  
**Joern Loviscach**  
Fachhochschule Bielefeld

### 37B. A Selective-Rendering Algorithm Based on Memory Schemas

**Alexandros Zotos**  
**Katerina Mania**  
Technical University of Crete

**Nicholaos Mourkoussis**  
University of Sussex

### 38A. BiDi Screen: Depth and Lighting Aware Interaction and Display

**Matthew Hirsch**  
Massachusetts Institute of Technology

**Douglas Lanman**  
Brown University

**Ramesh Raskar**  
**Henry Holtzman**  
Massachusetts Institute of Technology

### 38B. Bloxels: Glowing Blocks as Volumetric Pixels

**Jinha Lee**  
The University of Tokyo

**Yasuaki Takehi**  
Keio University

**Takeshi Naemura**  
The University of Tokyo

### 39A. collecTable: A Natural Interface for Music Collections

**Maria Paula Saba**  
Universidade Federal do Rio de Janeiro

**Luiz Velho**  
Instituto Nacional de Matemática Pura e Aplicada

**Andre Maximo**  
Universidade Federal do Rio de Janeiro

### 39B. The Design and Evaluation of a Lightweight Multi-View Interaction Metaphor for 3D Visualization in the CAVE

Andrew Bragdon  
David Laidlaw  
Brown University

### 40A. Factors Formatting Perceptual Impression in 3D Cyber Spaces: A Cross-Cultural Study of Korean and American Users

Mi-Sun Lee  
Mi-Gi Han  
Joo-Youn Park  
Su-e Park  
Seoul Women's University

### 40B. LipMouse – A Novel Multimodal Human-Computer Interaction Interface

Andrzej Czyzewski  
Piotr Dalka  
Bozena Kostek  
Gdansk University of Technology

### 41A. MYGLOBE: Cognitive Map as Communication Media

Fumitaka Ozaki  
Takuo Imbe  
Shin Kiyasu  
Yusuke Mizukami  
Yuta Sugiura  
Naohito Okude  
Masahiko Inakage  
Masahiko Inami  
Maki Sugimoto  
Adrian Cheok  
Shuichi Ishibashi  
Keio University

### 41B. PCCD: Parallel Continuous Collision Detection

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

### 42A. Pen de Touch

Sho Kamuro  
Kouta Minamizawa  
Naoki Kawakami  
The University of Tokyo

Susumu Tachi  
Keio University

### 42B. Real Map-Based Interface for Browsing Content on Mobile Devices

Kazuhiko Yamamoto  
Taketoshi Ushiamo  
Reiji Tsuruno  
Toki Takeda  
Kyushu University

### 43A. Sketch-Based Annotations in Google Earth

Christian Schulze  
Laurens Nienhaus  
Fachhochschule Bremen

Joern Loviscach  
Fachhochschule Bielefeld

### 43B. Smart Pen – A New Multimodal Computer Control Tool for Dyslexia Therapy

Andrzej Czyzewski  
Piotr Ody  
Agnieszka Grabkowska  
Michal Grabkowski  
Bozena Kostek  
Gdansk University of Technology

### 44A. TypeTile: A Keyboard System That Decorates Characters Depending on the Way of Typing

Yasuko Hayashi  
Kensei Jo  
The University of Tokyo

Yasuaki Kakehi  
Keio University/Presto, Japan Science and Technology Agency

Takeshi Naemura  
The University of Tokyo

### 44B. Utilizing Photos As Program Themes

Kai-Yin Cheng  
Ko-Yuan Chou  
Sheng-Jie Luo  
Bing-Yu Chen  
National Taiwan University

### 45A. Virtual Stroboscope for Robot Motion Design

Tatsuya Ishikawa  
Shoichi Hasegawa  
The University of Electro-Communications

## Modeling

### 46A. 3D Reconstruction of Planetary Nebulae Using Hybrid Models

Stephan Wenger  
Magnor Marcus  
Technische Universität Braunschweig

Morisset Christophe  
Steffen Wolfgang  
Universidad Nacional Autónoma de México

### 46B. A Natural Smile Synthesis From an Artificial Smile

Hiroki Fujishiro  
Takanori Suzuki  
Shinya Nakano  
Akinobu Maejima  
Shigeo Morishima  
Waseda University

### 47A. Accurate Skin-Deformation Model of Forearm Using MRI

Kentaro Yamanaka  
Shinsuke Nakamura  
Shota Kobayashi  
Waseda University

Akane Yano  
Sony Corporation

Masashi Shiraishi  
Shigeo Morishima  
Waseda University

### 47B. Aging Model of Human Face by Averaging Geometry and Filtering Texture in Database

Satoko Kasai  
Shigeo Morishima  
Waseda University

### 48A. City Generator: GIS Driven Genetic Evolution in Urban Simulation

Ming Tang  
Tang & Yang Architects, LLC

### 48B. Defining and Computing Mixed-Dimensional Skeletons

Lu Liu  
Tao Ju  
Washington University in St. Louis

### 49A. Dynamic Simplicial Meshes

Sebastian Pena Serna  
Fraunhofer-IGD

Andre Stork  
Fraunhofer-IGD, Technische Universität Darmstadt

### 49B. AeroSynth: Aerial Scene Synthesis from Images

David Nilosek  
Karli Walli  
Carl Salvaggio  
John Schott  
Rochester Institute of Technology

### 50A. Inca Reconstruction Using Shape Grammar

Jingyuan Huang  
Stephen Mann  
Bill Cowan  
University of Waterloo

### 50B. Lace Curtain: Modeling and Rendering of Woven Structures Using BRDF/BTDF -- Production of a Catalog of Curtain Animations --

Yoshiki Mizushima  
Shuhei Nomura  
Genki Umezumi  
Noriko Nagata  
Kwansei Gakuin University

Yoshiyuki Sakaguchi  
Digital Fashion Ltd.

### 51A. Numerical Simulation of Fluid Flow on Complex Geometries Using the Lattice-Boltzmann Method and CUDA-Enabled GPUs

Eugen Riegel  
Thomas Indinger  
Technische Universität München

### 51B. Representing 3D Mesh With Attributed Root Trees

Yu-Bin Yang  
Jin-Jie Ling  
Nanjing University

**52A. User Studies on the Feasibility of Oblique Contouring**

Ross Sowell  
Lu Liu  
Tao Ju  
Cindy Grimm  
Washington University in St. Louis

Christopher Abraham  
Garima Gokhroo  
Daniel Low  
Washington University School of Medicine

**Music****53A. A Visual Beat Detection System for Grid-Based Interactive Percussion and Synchronization**

Trishul Mallikarjuna  
Georgia Institute of Technology

**53B. The Blues Machine**

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

**54A. Pandeiro Funk: Experiments on Rhythm-Based Interaction**

Sergio Krakowski  
Luiz Velho  
Instituto Nacional de Matemática Pura e Aplicada

Francois Pachet  
Sony CSL/Paris

**Physics Simulation****55A. A Data-Driven Visual Simulation of Fire Phenomena**

Moohyun Cha  
Korea Institute of Machinery and Materials

**55B. Desired Deformation of Continuum Surfaces in 3DCG Animation by Time-Varying Stable Forms**

Ippei Takauchi  
Masatoshi Ochiai  
Hiromu Saito  
Ryo Asakura  
Motofumi Hattori  
Kanagawa Institute of Technology

**56A. The Framework of Sound Rendering for Particle-Based Physics**

Kazuhiko Yamamoto  
Kyushu University

**56B. Physics for Animation Artists**

Alejandro Garcia  
Alice A. Carter  
J. Courtney Granner  
David Chai  
San Jose State University

**57A. Real-Time Droplet Modeling Using Color-Space Environment Matting**

Biswarup Choudhury  
Pisith Hao  
Sharat Chandran  
Indian Institute of Technology, Bombay

**Rendering****58A. Autonomous Lighting Agents in Global Illumination**

Adrien Herubel  
Venceslas Biri  
Institut d'électronique et d'informatique Gaspard-Monge

Farchad Bidgolirad  
Duran Duboi

**58B. Beyond Triangles: Giga-voxels Effects in Video Games**

Cyril Crassin  
INRIA Rhône-Alpes

Fabrice Neyret  
LJK/INRIA/Grenoble Universities/CNRS

Sylvain Lefebvre  
INRIA Sophia-Antipolis

Miguel Sainz  
NVIDIA Corporation

Elmar Eisemann  
MPI Informatik, Universität des Saarlandes

**59A. Cosine Lobe Based Relighting From Gradient Illumination Photographs**

Graham Fyffe  
University of Southern California, Institute for Creative Technologies

**59B. Curvature-Dependent Local Illumination Approximation for Translucent Materials**

Hiroyuki Kubo  
Mai Hariu  
Shuhei Wemler  
Shigeo Morishima  
Waseda University

**60A. Direct Illumination From Dynamic Area Lights**

Greg Nichols  
Chris Wyman  
University of Iowa

**60B. Gaussian Projection: A Novel PBR Algorithm for Real-Time Rendering**

Sajid Farooq  
Paul Siebert  
University of Glasgow

**61A. Interactive Lighting Manipulation Application on GPU**

Borom Tunwattanapong  
Paul Debevec  
University of Southern California, Institute for Creative Technologies

**61B. Layered Solid Texture Synthesis From a Single 2D Exemplar**

Kenshi Takayama  
The University of Tokyo

Takeo Igarashi  
The University of Tokyo, JST/ERATO

**62A. Oriental Stylization With Strokes and Shades**

Seungju Bang  
Kyoungju Park  
Chung-Ang University

**62B. Painterly Caricature Maker**

Yoon-Seok Choi  
Electronics and Telecommunications Research Institute

In-Kwon Lee  
Yonsei University

Bon-Ki Koo  
Electronics and Telecommunications Research Institute

**63A. RACBVHs: Random-Accessible Compressed Bounding Volume Hierarchies**

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

**63B. Reflection Model of Metallic Paints for Reflectance Acquisition**

Masashi Baba  
Naoki Asada  
Hiroshima City University

**64A. Single-Pass Rendering of Composable Volumetric Lens Effects**

Jan-Phillip Tiesel  
Christoph W. Borst  
University of Louisiana at Lafayette

**64B. Variance Minimization Light-Probe Sampling**

Kuntee Viriyotha  
University of Southern California

Paul Debevec  
University of Southern California, Institute for Creative Technologies

**65A. Virtual Video Camera: Image-Based Viewpoint Navigation Through Space and Time** Christian Lipski

Christian Linz  
Kai Berger  
Marcus Magnor  
Technische Universität Braunschweig

**Scientific Visualization****66A. Data Visualization for a Stream Ecosystem and its Watershed**

Ouida Meier  
Western Kentucky University

**66B. The Journey of the Cystic Fibrosis Gene**

Phoebe Coleman  
University of Colorado Denver

**67A. Spatio-Temporal Sensing and Visualizing of CO<sub>2</sub>**

**Takashi Nariya**  
**Young Ah Seong**  
**Tomoko Hashida**  
**Takeshi Naemura**  
 The University of Tokyo

**67B. Visualization Laboratory for Earth Sciences: A Multidisciplinary Learning Environment**

**Aguilar Alejandro Sierra**  
 Universidad Nacional Autónoma de México

**Virtual Reality/  
Augmented Reality****68A. Augmented Reality Underwater**

**Lisa Blum**  
**Wolfgang Broll**  
 Fraunhofer-Institut für Angewandte Informationstechnik

**Stefan Müller**  
 Universität Koblenz

**68B. Bare-Hand Interaction in Tabletop-Augmented Reality**

**Bruno Fernandes**  
**Joaquin Fernández**  
 Universitat Politècnica de Catalunya

**69A. Flexible Foot Interface for Versatile Training Field**

**Hiroshi Mori**  
**Kazuhito Shiratori**  
**Tomoyuki Fujieda**  
**Jun'ichi Hoshino**  
 University of Tsukuba

**69B. Haptic Ring: Touching Virtual Creatures in Mixed-Reality Environments**

**Takafumi Aoki**  
**Hironori Mitake**  
 Tokyo Institute of Technology

**Shoichi Hasegawa**  
 The University of Electro-Communications

**Makoto Sato**  
 Tokyo Institute of Technology

**70A. Non-Photorealistic 3D Video-Avatar**

**Daniel Tokunaga**  
**Ricardo Nakamura**  
**Romero Tori**  
 Escola Politécnica da Universidade de São Paulo

**70B. Robot RockStars**

**Sheila Tejada**  
 Brooklyn College

**71A. SteganoScan: Persistence of Vision Display With Pixel-Level Visible Light Communication Projector**

**Ryo Kishi**  
 The University of Tokyo

**Yasuaki Kakehi**  
 Keio University/Presto, Japan Science and Technology Agency

**Takeshi Naemura**  
 The University of Tokyo

**71B. Stereoscopic Display Technique for Web3D Images**

**Kazuhiya Yanaka**  
 Kanagawa Institute of Technology

**Student Research Competition Semi-Finalists****ACM Student Research Competition Presentations**

Finalists in the ACM Student Research Competition present their work to SIGGRAPH 2009 attendees and receive their prizes.

Friday, 7 August | 10:30 am - 12:15 pm  
 Rooms 265-266

**1A. 3D Reconstruction of Planetary Nebulae Using Hybrid Models**

**Stephan Wenger**  
**Magnor Marcus**  
 Technische Universität Braunschweig

**Morisset Christophe**  
**Steffen Wolfgang**  
 Universidad Nacional Autónoma de México

**1B. Adaptive Coded Aperture Projection**

**Max Grosse**  
 Bauhaus-Universität Weimar

**Gordon Wetzstein**  
 The University of British Columbia

**Anselm Grundhoefer**  
**Oliver Bimber**  
 Bauhaus-Universität Weimar

**2A. Augmented Reality Under Water**

**Lisa Blum**  
**Wolfgang Broll**  
 Fraunhofer-Institut für Angewandte Informationstechnik

**Stefan Müller**  
 Universität Koblenz

**2B. Automatic Colorization of Grayscale Images Using Multiple Images on the Web**

**Yuji Morimoto**  
**Yuichi Taguchi**  
**Takeshi Naemura**  
 The University of Tokyo

**3A. Autonomous Lighting Agents in Global Illumination**

**Adrien Herubel**  
**Venceslas Biri**  
 Institut d'électronique et d'informatique Gaspard-Monge

**Farchad Bidgolirad**  
 Duran Duboi

**3B. Bare-Hand Interaction in Tabletop-Augmented Reality**

**Bruno Fernandes**  
**Joaquin Fernández**  
 Universitat Politècnica de Catalunya

**4A. Beyond Triangles: Giga-voxels Effects in Video Games**

**Cyril Crassin**  
 INRIA Rhône-Alpes

**Fabrice Neyret**  
 LJK/INRIA/Grenoble Universities/CNRS

**Sylvain Lefebvre**  
 INRIA Sophia-Antipolis

**Miguel Sainz**  
 NVIDIA Corporation

**Elmar Eisemann**  
 MPI Informatik, Universität des Saarlandes

**4B. BiDi Screen: Depth- and Lighting-Aware Interaction and Display**

**Matthew Hirsch**  
 Massachusetts Institute of Technology

**Douglas Lanman**  
 Brown University

**Ramesh Raskar**  
**Henry Holtzman**  
 Massachusetts Institute of Technology

**5A. Bloxels: Glowing Blocks as Volumetric Pixels**

**Jinha Lee**  
The University of Tokyo

**Yasuaki Kakehi**  
Keio University

**Takeshi Naemura**  
The University of Tokyo

**5B. Curvature-Dependent Local Illumination Approximation for Translucent Materials**

**Hiroyuki Kubo**  
**Mai Hariu**  
**Shuhei Wemler**  
**Shigeo Morishima**  
Waseda University

**6A. Defining and Computing Mixed-Dimensional Skeletons**

**Lu Liu**  
**Tao Ju**  
Washington University in St. Louis

**6B. Direct Illumination From Dynamic Area Lights**

**Greg Nichols**  
**Chris Wyman**  
University of Iowa

**7A. GreenLite Dartmouth: Unplug or the Polar Bear Gets It**

**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

**7B. Haptic Ring: Touching Virtual Creatures in Mixed-Reality Environments**

**Takafumi Aoki**  
**Hironori Mitake**  
Tokyo Institute of Technology

**Shoichi Hasegawa**  
The University of Electro-Communications

**Makoto Sato**  
Tokyo Institute of Technology

**8A. Interactive Lighting Manipulation Application on GPU**

**Borom Tunwattanapong**  
**Paul Debevec**  
University of Southern California,  
Institute for Creative Technologies

**8B. Layered Solid Texture Synthesis From a Single 2D Exemplar**

**Kenshi Takayama**  
The University of Tokyo

**Takeo Igarashi**  
The University of Tokyo, JST/ERATO

**9A. Muscle-Based Facial Animation Considering Fat-Layer Structure Captured by MRI**

**Hiroto Yarimizu**  
**Yasushi Ishibashi**  
**Hiroyuki Kubo**  
**Akinobu Maejima**  
**Shigeo Morishima**  
Waseda University

**9B. Pandeiro Funk: Experiments on Rhythm-Based Interaction**

**Sergio Krakowski**  
**Luiz Velho**  
Instituto de Matemática Pura e Aplicada

**François Pachet**  
Sony CSL/Paris

**10A. Pen de Touch**

**Sho Kamuro**  
**Kouta Minamizawa**  
**Naoki Kawakami**  
The University of Tokyo

**Susumu Tachi**  
Keio University

**10B. Polygonal Functional Hybrids for Computer Animation and Games**

**Denis Kravtsov**  
**Oleg Fryazinov**  
**Valery Adzhiev**  
**Alexander Pasko**  
**Peter Comninos**  
NCCA, Bournemouth University

**11A. Proportional Constraint for Seam Carving**

**Kei Utsugi**  
**Takuma Shibahara**  
**Takafumi Koike**  
Hitachi Ltd.

**Takeshi Naemura**  
University of Tokyo

**11B. RACBVHs: Random-Accessible Compressed Bounding Volume Hierarchies**

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

**12A. Ray Tracing to Get 3D Fixations on VOIs From Portable Eye Tracker Videos**

**Susan Munn**  
**Jeff Pelz**  
Rochester Institute of Technology

**12B. Three-Dimensional Auto-Stereoscopic Animated Image With a Long Viewing Distance Using High-Precision Image Correction**

**Takehito Teraguchi**  
**Hiromasa Yamashita**  
**Ken Masamune**  
**Takeyoshi Dohi**  
**Hongen Liao**  
The University of Tokyo

**13A. Variance Minimization Light-Probe Sampling**

**Kuntee Viriyotha**  
University of Southern California

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

# THE STUDIO



## DAYS & HOURS

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

## LOCATION

Rooms 343-345

The Studio is an environment reserved for creative output. It is a studio where artists come together to make their work, share their methods, and exchange ideas with one another and the conference at large. It mixes traditional and cutting-edge creative tools, professional artists, novices, scientists, and technicians into an inspiring learning environment. The Studio is staffed with expert volunteers who can help attendees navigate technologies and activities in order to confidently explore their own artistic ideas.

The Studio provides a broad range of opportunities for conference attendees on a variety of levels. Learning, creating, teaching and other interactions occur among conference attendees, the Studio team, our technology contributors and sponsors.

The Studio is a working “digital kitchen”, a “collaboratory” for testing new ideas in digital media and computing, and for merging traditional techniques with digital processes and making computational creole.

This year’s Studio “menu” serves up a host of entrées for great experiences and digits-on learning opportunities:

**2D imaging, drawing, compositing, and manipulation**

**3D modeling, scanning, printing, and prototyping**

**4D animation, video, motion capture, stop motion, interactivity, music, and sound**

To add another dimension for everyone, The Studio also presents a full daily program on the studio stage and classroom for workshops, lectures, and performances.

## FJORG! & GameJam! Judging Ceremony

Thursday, 6 August | 6 - 8 pm  
Hall E 1-2

Fun-filled and dramatic ceremony in which FJORG! and GameJam! participants present their completed projects.

# FJORG!

### DAYS & HOURS

Monday, 3 August  
Tuesday, 4 August

9 am - Midnight  
Midnight - 5 pm

### LOCATION

Rooms 255-257

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. Teams are formed based on participants' skills and expertise.



Corporate Sponsor

## THE TEAMS

### PEANUT BUTTER JELLY

Paola E. Paulino  
Brendan Carroll  
Joo Young Lee  
Ringling College of Art + Design

### Prestissimo

Sasapitt Rujirat  
Phon Tiramongkol  
Lee Croudy  
The Monk Studio

### The Stepped Children

Jorge Garcia  
Dan Lane  
Liron Topaz  
Ringling College of Art + Design

### Team Riot

John Sabbath  
Gayane Bagdasaryan  
Shuang Chang  
Rochester Institute of Technology

### Squid Juice

Kelly Mermelstein  
Taylor Cook  
Vadim Kiyarov  
Pratt Institute

### OAW

HongJoong Kim  
HyeSook Kim  
SeJin Lee  
anipark studio

### Sparkle Kittens

Alejandra Quintas  
Gianna Ruggiero  
Kent Muddle  
Ringling College of Art + Design

### A.O.M.

Christopher Monti  
Linlin Si  
Xuemei Song  
Rochester Institute of Technology

### Briar Roses

Ami DeLullo  
Kristin Palach  
Dawn Rivers  
Ringling College of Art + Design

### The Bunko Squad

Frank Suarez  
Kinlyn Chou  
Chase Hill  
Bunko Studios, Inc.

# GAMEJAM!

### DAYS & HOURS

Tuesday, 4 August  
Wednesday, 5 August

6 pm - Midnight  
Midnight - 6 pm

### LOCATION

Rooms 255-257

GameJam! hosts two competitions during the 24-hour competition. Twenty participants collaborate and create a 3D game using the Panda3D game engine. Nine participants compete in teams of three to create 2D games using Flash.

Prizes will be given for best 3D character, SIGGRAPH attendees' favorite 3D character, most lifelike 3D character, most creative 3D character, best 2D game, and SIGGRAPH attendees' favorite 2D game.

## PARTICIPANTS

### 3D GAME PARTICIPANTS

**Neil Bonsteel**  
Rochester Institute of Technology

**Ben Colbourn**  
Fullsail University

**Riannon Delaney**  
Rochester Institute of Technology

**John Fielding**  
Rochester Institute of Technology

**Brianne Francisco**  
Rochester Institute of Technology

**Dylan Hunter**  
Animation Mentor

**Scott Huster**  
Animation Mentor

**James Maloney**  
Bowling Green State University

**Ryan Neff**  
Rochester Institute of Technology

**Brian Nixon**  
Bowling Green State University

**Emily Oess**  
Animation Mentor

**Rory Riggins**  
Rochester Institute of Technology

**Benjamin Rosales**  
LDSanimators.com

**Elizabeth Sewell**  
FullSail University

**Teri Shellen**  
Animation Mentor

**Eric Savino**  
Fullsail University

**Greg Wark**  
Bowling Green State University

**Toby Winder**  
Animation Mentor

### 2D GAME PARTICIPANTS

**Left 3 Dead**  
**Jonathan Holt**  
**Michael Molinari**  
**Andrew Deeds Walton**  
Ringling College of Art + Design

**Organic Lava Blocks**  
**Chance Dodd**  
**Melissa Guldbbrand**  
**Laurissa Hughes**

**The Manimators**  
**Carlos D'Hazas**  
**Watcharin Jariyasukdipong**  
**Luis Salazar**  
Woodbury University

# RESEARCH CHALLENGE

## DAYS & HOURS

Tuesday, 4 August

1:45 - 3:30 pm

## LOCATION

Rooms 265-266

A special session in which the selected finalists who have worked on this year's Research Challenge problem present their solutions. Judges evaluate the projects and award wonderful prizes to the teams displaying the most complete, creative, elegant, and appealing solutions.

The SIGGRAPH 2009 Research Challenge problem, announced October 2008, is: "Choose a specific animal, or a specific animal's sense, and develop a system that will enable a person to experience the physical or social world as that animal does."

## THE FINALISTS

### The P-War: Interactive Social Game Based on Dogs' Territorial Behaviors

Dogs have been human companions for ages, and we humans often assume that we understand them better than we actually do. P-War is an experimental game that uses GPS and mobile technologies that allows players to experience dog social dynamics from a dog's point of view while physically interacting with each other and exploring territories they mark as dogs would, using the custom-designed P-War mobile screen interface.

**Younghui Kim**  
Sanghwa Hong  
Jaeseok So

**Hyuna Choi**  
Soomi Jeong

**Hyunhee Kim**  
Hongik University

### Project: Prey

Project: Prey simulates the auditory and visual experiences of animals of prey, including (among others) rabbits, deer, and squirrels. It allows human users to experience "hearing" with two ears that rotate 180 degrees, independently of each other. The project also provides users an opportunity to "see" with monocular vision. Both experiences are markedly different from the auditory and visual capabilities of human beings.

**Matt Canada**  
Felicia Collum  
David Martinez

**Chris Ozone**  
Toija Riggins  
Aaron Yaw

**Kara Bohnenstiel**  
New York City College  
of Technology

### Catalyst: Seeing Through the Eyes of a Cat

This simulation of the cat visual system is based on neuroscientific research. It illustrates four of the major differences between the cat and human visual systems, and maps those contrasts into a space that can be readily observed by humans. This project also includes an educational game that is designed to teach players about how their vision differs from cat vision.

**Jeremy Long**  
Anthony Estey

**David Bartle**  
Sven Olsen

**Amy Gooch**  
University of Victoria

### An Ant's Life

In this first person interactive game, players experience the world as members of an ant colony, from hatching through successive life phases in and around the nest. The game's interface maps the ant's dominant senses (smell, taste, and touch) to a first-person interactive audiovisual display, conveying a localized and qualitative perception of the environment. The game takes place in a fully accessible and interactive simulation of the colony and its environment, populated by other ants and critters. As the ants mature, they grow larger and stronger, their senses become more refined, and their range increases.

**Alexandre Francois**  
Ian Altgilbers  
Jessie Berlin  
Alissa Cooper  
Eric Gustavson

**Greg Harris**  
Matthew Knowles  
Huy Ngu  
Gregory Scott  
Rashmi Singhal

**Eric Stewart**  
Daniel Thayer  
Lindsay Verola  
Sonny Zhao  
Tufts University

# SPEEDLAB

### Opening Session

Monday, 3 August | 3:45 - 5:30 pm  
Rooms 265-266

SpeedLab is a multi-disciplinary competition, in which teams are assigned a problem at the beginning of SIGGRAPH 2009, and they present their solutions to a panel of celebrity judges four days later. The judges select the winning teams and confer fame and prizes. Solutions will be evaluated on their creativity, practicality, and "cool factor".

It's easy to join a SpeedLab team. Attend the SpeedLab opening session, Monday, 3:45 - 5:30 pm, in Room 265-266. We invite both students and professionals to participate. Teams will be formed at SIGGRAPH 2009 based on participants' skills and expertise.

# BIRDS OF A FEATHER

Attendees who want to get together with others who share their interests, goals technologies, environments, or backgrounds are invited to attend a Birds of a Feather session. For a listing of the Birds of a Feather days, times, and locations see the SIGGRAPH 2009 Conference Locator.

## 3D Printing for Art and Visualization

Jeremy Swan  
*swanjere (at) mail.nih.gov*

## ACCAD/OSU Alumni Gathering

Elaine Smith  
*Elaine (at) accad.ohio-state.edu*

## ACM SIGGRAPH Cartographic Visualization Project Birds of a Feather Meeting

Theresa Marie Rhyne  
*tmrhyne (at) nscu.edu*

## AnimationMentor.com Gathering

Molly Wolfsehr  
*molly (at) animationmentor.com*

## Animux: Free Software for Animators

Mark Puttnam  
*mark (at) animux.org*

## Beyond the Screens: How to Turn Everything Into Interactive Media

Umyot Boonmarlart  
*umyotb (at) gmail.com*

## Blender Foundation, Artist Showcase

Ton Roosendaal  
*Ton (at) blender.org*

## Blender Foundation, Community Meeting

Ton Roosendaal  
*Ton (at) blender.org*

## BRL-CAD: Open-Source Solid Modeling

Christopher Sean Morrison  
*siggraph (at) brlcad.org*

## Collaborative Undergraduate Computing Studios Facilitating Decentralized Participation

Margaret Lomas Carpenter  
*marge (at) viz.tamu.edu*

## COLLADA BOF

Rita Turkowski  
*marketing (at) khronos.org*

## Come Meet the SIGGRAPH Student Services (S3) Committee

Lou Harrison  
*lou\_harrison (at) siggraph.org*

## Computer Graphics for Simulation BOF

John F. Richardson  
*Richards (at) spawar.navy.mil*

## Computer Graphics Pioneers Reception

Michael Macedonia  
*MMacedonia (at) fortterrainc.com*

## DIVERSE - Flexible Open-Source VE API

John Kelso  
*Kelso (at) nist.gov*

## Dynamic Simulation Birds of a Feather

Mark A. McLaughlin  
*mark.mclaughlin (at) disney.com*

## Friends of the Art Institutes

Jennifer Lasater  
*jlaser (at) edmc.edu*

## Interactive Ray Tracing

Peter Shirley  
*pshirley (at) nvidia.com*

## Interdisciplinary Computer Graphics Education

Jasminka Hasic  
*jhasic (at) gmail.com*

## Leonardo Town Hall Meeting

Pam Grant-Ryan  
*pgr (at) leonardo.info*

## Molecular Graphics

Jeremy Swan  
*swanjere (at) mail.nih.gov*

## Motion Graphics BOF

Gil Irizarry  
*Gil (at) conoa.com*

## OpenCL BOF

Neil Trevett  
*ntrevett (at) nvidia.com*

## OpenGL BOF

Barthold Lichtenbelt  
*marketing (at) khronos.com*

## OpenSG Birds of a Feather

Dirk Reiners  
*mail (at) dirkreiners.com*

## OpenSceneGraph BOF

Paul Martz  
*Pmartz (at) skew-matrix.com*

## Purdue University Reunion

James Sprinkles  
*jsprink (at) purdue.edu*

## RIT Alumni Reception

Ron Goldberg  
*rjgrar (at) rit.edu*

## Second Multi-User Virtual Environments Meeting (MUVEmoot)

Chris Thorne  
*Dragonmagi (at) gmail.com*

## Sharing Ideas in Teaching 3D Animation

Richard Lapidus  
*lapidus (at) morainevalley.edu*

## Shotgun Users Group

Kevin Porterfield  
*kp (at) shotgunsoftware.com*

## SIGGIG: Gays in Graphics

Jeffrey Weekley  
*jdweekle (at) nps.edu*

## SIGGRAPH Pin Collectors Showcase

Christopher Sean Morrison  
*siggraph (at) brlcad.org*

## Simulating Humans and Animals

Philippe Beaudoin  
*beaudoin (at) cs.ubc.ca*

## Taipei ACM SIGGRAPH Reunion

Bing-Yu Chen  
*robin (at) ntu.edu.tw*

## Teaching Computer Graphics in Context

Steve Cunningham  
*rsc (at) cs.csustan.edu*

## Teaching Math Through Game Development

Mitch Williams  
*Mitch.williams (at) 3d-online.com*

## Temerity Pipeline User Group

Jim Callahan  
*jim (at) temerity.us*

## Tokyo ACM SIGGRAPH Chapter Party

Yukio Ando  
*Yukio.andoh (at) gmail.com*

## UNC SIGGRAPH Alumni Reception

Courtney Ferriter  
*ferriter (at) cs.unc.edu*

## Using Computer Graphics in Performance

Marla Schweppe  
*marla\_schweppe (at) siggraph.org*

## Web3D CAD Working Group

Anita Havele  
*Anita.havele (at) web3d.org*

## Web 3D User Interface Working Group

Anita Havele  
*Anita.havele (at) web3d.org*

## Women in Animation - Men are Welcome Too!

Pamela Thompson  
*pamrecruit (at) q.com*

## X3D Medical Working Group

Anita Havele  
*Anita.havele (at) web3d.org*

## X3d, MIDI, and Sound

Anita Havele  
*Anita.havele (at) web3d.org*

# INTERNATIONAL RESOURCES

## DAYS & HOURS

Sunday, 2 August	2 - 6 pm
Monday, 3 August	8 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 - 2 pm

## LOCATION

Hall G (SIGGRAPH Village)

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. Throughout the year, the International Resources program facilitates worldwide collaboration in the SIGGRAPH community, provides an English Review Service to help submitters whose first language is not English, and encourages participation in all conference venues, activities, and events.

## INTERNATIONAL RESOURCES COMMITTEE

### Scott Lang (USA)

*International Resources Co-Chair*  
Bergen County Academies  
Languages: English

### Sandro Alberti (Mexico, USA)

*International Resources Co-Chair*  
fen-om; Universidad de Guadalajara  
Languages: Spanish, Italian, English

### Matt Adcock (Australia)

*English Review Coordinator*  
CSIRO Australia  
Languages: English

### Alexis Casas

*International Resources Booth Manager*  
Delacave  
Languages: English, French, Spanish, German

### Miho Aoki (Japan)

Arctic Region Supercomputing Center,  
University of Alaska Fairbanks  
Languages: Japanese, English

### Kirsten Cater (United Kingdom)

University of Bristol, United Kingdom  
Languages: English

### Alexia Convers (France, USA)

Studio PCH  
Languages: French, Spanish, English,  
Czech, Serbo-croatian

### Wobbe F. Koning (The Netherlands)

Montclair State University  
Languages: Dutch, German, English

### Yong Tsui Lee (Singapore)

Nanyang Technological University  
Languages: Mandarin, English

### Patrick Marais (South Africa)

University of Cape Town  
Languages: English

### Marilenis Olivera (Venezuela, USA)

Stanford University  
Languages: Spanish, English

## INTERNATIONAL RESOURCES EVENTS

### LOCATION

Hall G (SIGGRAPH Village)

Informative international sessions on the current state of computer graphics around the world, organized by representatives of ACM SIGGRAPH and affiliated societies.

### SpaceTime Animation Screening

Monday, 3 August, through Thursday, 6 August  
10 am - 1 pm

Digital review of projects accepted to the annual SpaceTime competition. Featuring the state of creative computer-based student work from around the globe.

Contact: [mjbarr \(at\) mtsu.edu](mailto:mjbarr@mtsu.edu) (Marc Barr)

### Overview of SIGGRAPH 2009 (with Japanese interpreter)

Monday, 3 August  
1 - 3 pm

Members of the SIGGRAPH 2009 Committee present an overview of the conference and highlights of their programs.

Contact: [mihoalaska \(at\) gmail.com](mailto:mihoalaska@gmail.com) (Miho Aoki)

### SpaceTime Student Exhibition Opening

Monday, 3 August  
3:30 - 4:30 pm

Opening and Awards presentation for ACM SIGGRAPH SpaceTime Student Exhibition.

Contact: [mjbarr \(at\) mtsu.edu](mailto:mjbarr@mtsu.edu) (Marc Barr)

## CG in Latino Countries

Monday, 3 August  
4:30 - 5:30 pm

A brief overview of the state of CG in Latino countries. The session ends with a celebratory piñata.

**Contact:** [marilenis \(at\) gmail.com](mailto:marilenis@gmail.com) (Marilenis Olivera)

## Inter-Society for the Electronic Arts (ISEA) Open Forum

Tuesday, 4 August  
1 - 2:30 pm

ISEA is an international non-profit organization fostering interdisciplinary academic discourse and exchange among culturally diverse groups and individuals working with art, science, and emerging technologies. This discussion includes information about the organization, the upcoming ISEA Symposium to be held in the Ruhr region, Germany in 2010, and plans for the future of ISEA, including the new Headquarters based at The University of Brighton, UK and the launch of the ISEA archive site. All interested members of the electronic arts community are welcome to attend, to learn about future symposia and share ideas for potential organizational collaborations.

**Contact:** [sue.gollifer \(at\) gmail.com](mailto:sue.gollifer@gmail.com) (Sue Gollifer)

## Communicating and Understanding Camera Culture

Tuesday, 4 August  
2:30 - 4 pm

This forum features Ramesh Raskar (Camera Culture, MIT Media Lab), who is presenting the SIGGRAPH 2009 Course Next Billion Cameras, and provides an opportunity to discuss "camera culture" with people in various fields. The session focuses on next-generation cameras and how our lives will change to adapt to these new inventions. Presented in English with a Japanese interpreter.

**Contact:** [ayumi.miyai \(at\) cgarts.or.jp](mailto:ayumi.miyai@cgarts.or.jp) (Ayumi Miyai, CG Arts)

## Professional Chapters and Student Chapters Start-Up Meeting

Wednesday, 5 August  
12:30 - 1:30 pm

The Professional and Student Chapters of ACM SIGGRAPH span the globe. Within their local areas, chapters continue the work of ACM SIGGRAPH on a year-round basis via their meetings and other activities. Each chapter consists of individuals involved in education, research and development, the arts, industry, and entertainment who are interested in the advancement of computer graphics and interactive techniques, related technologies, and their applications. Chapter members gather throughout the year at meetings, site visits, conferences, video screenings, art shows, and special events.

This session explains how to start and run a successful ACM SIGGRAPH Professional or Student Chapter. Topics regarding the process are outlined in detail by members of the Chapters Committee, and the session concludes with a Q&A session.

**Contact:** [scott \(at\) siggraph.org](mailto:scott@siggraph.org) (Scott Lang)

## Animation by Japanese Students

August 5, Wednesday  
1:30 - 2 pm

DCAJ shows some of the animation works by young Japanese students which won prizes at Digital Creators Competition 2008 (DCC 2008). Also, animations submitted by young Korean, Canadian and Malaysian artists will be included.

**Contact:** [suzuki \(at\) dcaj.or.jp](mailto:suzuki@dcaj.or.jp) (Toshio Suzuki)

## Industrial Application of CG in Japan

August 5, Wednesday  
2 - 3 pm

DCAJ presents some of Japanese companies practicing highly advanced industrial application of CG technology.

**Contact:** [suzuki \(at\) dcaj.or.jp](mailto:suzuki@dcaj.or.jp) (Toshio Suzuki)

## Art & Economics of Animation in Latin America

Wednesday, 5 August  
3 - 4:15 pm: Presentation  
4:15 - 5 pm: Latin Snacks

Presentations by Latin America chapters and producers, including short demo. The goal of this talk is to shed light on the quality of animation that can - and is - being produced in Latin America. The types of service that clients can expect, as well as the costs and time involved in producing animation in Latin America, are also discussed.

**Contact:** [alejandro.perelman \(at\) avsistemas.com](mailto:alejandro.perelman@avsistemas.com) (Alejandro Perelman)

## Chapters Business Meeting

Thursday, 6 August  
9 - 10 am: Meeting

The annual Business Meeting for the ACM SIGGRAPH Chapters.

**Contact:** [scott \(at\) siggraph.org](mailto:scott@siggraph.org) (Scott Lang)

# ACM SIGGRAPH EXECUTIVE COMMITTEE



**President**

**G. Scott Owen**  
Georgia State University

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Georgia Institute of Technology

**Treasurer**

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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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## ACM SIGGRAPH

In the span of 35 years, ACM SIGGRAPH has grown from a handful of computer graphics enthusiasts to a diverse group of researchers, artists, developers, filmmakers, scientists, and other professionals who share an interest in computer graphics and interactive techniques. Our community values excellence, passion, integrity, volunteerism, and cross-disciplinary interaction. We sponsor not only the annual SIGGRAPH conference, but also focused symposia, chapters in cities throughout the world, awards, grants, educational resources, online resources, a public policy program, and the SIGGRAPH Video Review. The second annual SIGGRAPH ASIA conference will be held in Yokohama, Japan, December 2009.

## Membership

The SIGGRAPH community depends on your support. Help us continue our global efforts in education, communications, and advocacy by joining ACM SIGGRAPH for \$42 per year (\$30 per year for students, \$47 for Pioneers, and \$28 for Eurographics members). Become an ACM SIGGRAPH member and receive a siggraph.org email alias, access to the archive of SIGGRAPH Proceedings in the ACM Digital Library, Computer Graphics e-Quarterly, discounted registrations on ACM SIGGRAPH sponsored programs and events including the annual SIGGRAPH and SIGGRAPH Asia conferences and partner conferences such as Eurographics, as well as discounts on publications and preferred vendor deals on valuable merchandise. For more details on membership or to join online, visit [www.siggraph.org](http://www.siggraph.org) → and select "Membership." For those of you who are already members, thank you for your continued and loyal support.

## ACM

ACM SIGGRAPH's parent organization is ACM, the Association for Computing Machinery. ACM is the world's largest educational and scientific computing society, uniting educators, researchers, and professionals to inspire dialogue, share resources, and address the field's challenges. ACM strengthens the computing profession's collective voice through strong leadership, promotion of the highest standards, and recognition of technical excellence. ACM supports the professional growth of its members by providing opportunities for life-long learning, career development, and professional networking. Many ACM SIGGRAPH members also join ACM. The benefits of ACM membership include full access to online books and courses, the ACM Career & Job Center, subscriptions to ACM's popular email alert news digests TechNews and CareerNews, and the online newsletter Member-Net. ACM members may subscribe to the

Digital Library and receive full access to the Guide to Computing Literature, which features more than one million bibliographic citations from the vast world of computing. ACM members also receive discounts on cutting-edge magazines, journals, books, and conferences. For more information, visit: [www.acm.org](http://www.acm.org) →

## Awards

ACM SIGGRAPH awards the prestigious Steven A. Coons award for lifetime achievement, the Computer Graphics Achievement Award for notable achievements, the Significant New Researcher Award for new contributors to our field, the Outstanding Service Award, and the Distinguished Artist Award for lifetime achievement in digital art. For a list of past award recipients, visit: [www.siggraph.org/awards](http://www.siggraph.org/awards) →

## Education Committee

The ACM SIGGRAPH Education Committee works to support computer graphics education as well as the use of computer graphics in education. Computer graphics education encompasses technical, creative, and developmental studies in curricular areas ranging from computer science to digital arts. The Education Committee undertakes a broad range of projects and activities in support of the CG education community, such as curriculum studies, resources for educators, and SIGGRAPH conference-related activities. This includes the international, juried SpaceTime Student Competition & Exhibition and much more. For more information, please visit: [education.siggraph.org](http://education.siggraph.org) →

## Digital Arts Community

The ACM SIGGRAPH Digital Arts Community committee serves to foster the evolution of a strong digital arts community within the international organization and to promote a dialogue between visual artists and the larger SIGGRAPH community. It maintains an interactive Arts Portal, [arts.siggraph.org](http://arts.siggraph.org), with an associated social networking site, [siggrapharts.ning.com](http://siggrapharts.ning.com) → that provides a central place for artists and scientists to share resources, information, artwork, and opportunities. All SIGGRAPH members are invited to utilize the site to follow developments in the arts, stay connected, and identify potential collaborators. For more information visit: [arts.siggraph.org](http://arts.siggraph.org) →

# ACM SIGGRAPH Organization Overview

## External Relations Committee

ACM SIGGRAPH has agreements with a number of organizations and conferences around the world. To see the list of current affiliations or to inquire about what is involved in entering into such a relationship, stop by the ACM SIGGRAPH Membership booth.

## Professional & Student Chapters

Chapters of ACM SIGGRAPH exist in 65 cities in 16 countries around the world. They form an international multi-cultural network of people who develop, share, continue, and extend the work and achievements presented at the annual conference. Chapter members include those involved in research, development, education, art, gaming, visualization, and entertainment, just to name a few. For more information about the ACM SIGGRAPH network of chapters, or if you would like to start a Professional or Student Chapter, visit: [www.siggraph.org/chapters](http://www.siggraph.org/chapters) →→

## Publications

ACM SIGGRAPH publications provide the world's leading forums for computer graphics research. Our conference series provides the largest source of citations in computer graphics literature. Publications are available to ACM SIGGRAPH members for substantial discounts. See: [www.siggraph.org/publications](http://www.siggraph.org/publications) →→

## Small Conferences and Symposia

ACM SIGGRAPH helps organize and sponsor focused conferences, workshops, and other symposia around the world on topics related to computer graphics and interactive techniques. These gatherings enable groups with specific interests to get together and exchange information. To see the list of symposia or find out how to get help for a conference you'd like to organize, stop by the ACM SIGGRAPH Membership booth or visit: [www.siggraph.org/events/symposia](http://www.siggraph.org/events/symposia) →→

## SIGGRAPH 2010

Los Angeles, California

Interested in participating in the SIGGRAPH 2010 conference as a presenter or volunteer? Stop by the SIGGRAPH 2010 booth in Hall F Lobby, talk with the volunteer leaders who organize the annual SIGGRAPH conference, and discover how you can contribute your expertise and energy. Questions and comments are encouraged.

[www.siggraph.org/s2010](http://www.siggraph.org/s2010) →→

## SIGGRAPH Asia 2009

Yokohama, Japan

Start planning now to be in Yokohama for the second SIGGRAPH Asia Conference and Exhibition. Drop by our booth in Hall F Lobby and have a chat with us to find out more details. [www.siggraph.org/asia2009](http://www.siggraph.org/asia2009) →→

## SIGGRAPH Asia 2010

15-18 December 2010

Seoul, Korea

Drop by the SIGGRAPH Asia 2009 Booth located in Hall F Lobby for more information.

## SIGGRAPH Video Review

SIGGRAPH Video Review is the world's most widely circulated video-based publication. Over 160 programs document the annual SIGGRAPH Computer Animation Festival, providing an unequalled opportunity to study state-of-the-art computer graphics techniques, theory, and applications. New releases and recent issues are available in DVD format. Visit the SIGGRAPH Review booth outside the La Nouvelle Orleans Ballroom.

## Volunteers

All of the programs developed by ACM SIGGRAPH rely heavily on volunteer support. As a member, you are eligible to serve in some of ACM SIGGRAPH's most visible positions, including leading a professional chapter, chairing the annual conference, or serving on the ACM SIGGRAPH Executive Committee. For more information, see: [www.siggraph.org/gen-info/volunteer-positions.shtml](http://www.siggraph.org/gen-info/volunteer-positions.shtml) →→

## Annecy

Annecy has been showcasing the very best in animation for over 45 years, making it the industry's leading international competitive festival. The capacity to present and promote animation in all its different forms has made Annecy a world-wide point of reference for the animation industry.

[www.annecy.org](http://www.annecy.org) →

## China Cartoon Industry Forum (CCIF)

Supported by the Chinese government, the China Cartoon Industry Forum was founded by the Cartoon Commission of China TV Artists Association. As the most influential Chinese conference, CCIF promotes industrialization, internationalization, and market development. CCIF operates two projects, which are 'Asian Youth Animation & Comics Contest' (AYACC) and 'China Animation & Comics Game' (CACG). Asian Youth Animation & Comics Contest is aimed to be the top annual award for Asian original animation and comic. CACG is committed to building an animation-training system to provide vocational animation and comics training courses studies for all trainees in China.

[www.ccif.com.cn](http://www.ccif.com.cn) / [www.51cacg.com](http://www.51cacg.com) →  
*(will be launched with English and Chinese versions soon)*

## Computer Graphics Arts Society (CG-ARTS)

The Computer Graphics Arts Society, officially recognized by the Ministry of Education, Culture, Sports, Science and Technology in 1992, is a publicly funded body dedicated to promoting Japanese computer graphics education from drafting curricula to the development and publication of teaching materials, nurturing instructors, and providing certification tests to evaluate the ability of each individual. It is also dedicated to developing a distinctive Japanese media arts culture in the 21st century by hosting the Computer Graphics Contest for Students since 1995 and co-organizing the Japan Media Arts Festival in conjunction with the Agency for Cultural Affairs since 1996.

[www.cgarts.or.jp](http://www.cgarts.or.jp) →

## Digital Content Association of Japan (DCAJ)

DCAJ is a government-approved non-profit organization promoting the Japanese digital content industry. It organizes Digital Content Expo (DC EXPO) 2009 ([www.dcexpo.jp](http://www.dcexpo.jp)) from October 22 to 25 at Miraikan Museum in Tokyo.

[www.dcaj.org/outline/english/index.html](http://www.dcaj.org/outline/english/index.html) →

## Eurographics

The European Association for Computer Graphics is a professional association that assists members with their work and careers in computer graphics and interactive digital media. Eurographics has members worldwide and maintains close links with developments in the USA, Japan, and other countries, by inviting speakers from those countries to participate in Eurographics events and by sending representatives to other events. Eurographics 2010 will be held in Norrköping, Sweden May 3-7, 2010.

[www.eg.org](http://www.eg.org) →

## FMX

FMX is the primary European meeting of the digital community. Presenting cutting edge digital entertainment, the conference addresses the interests of professionals in creation, production and distribution from all corners of the industry. Innovative approaches in the animation, visual effects and gaming industries create a focus for discussions about the convergence and future of digital entertainment.

Meet top names in the industry as they present their latest achievements, interview with recruiters searching for new talent and test hard- and software innovations directly with developers – all in an open atmosphere of qualified discussion and informal encounter. The level of knowledge and experience and the openness with which it is shared has made FMX a set date for cg professionals all around the world.

[www.fmx.de](http://www.fmx.de) →

## IMAGINA

IMAGINA will be held at the Grimaldi Forum in Monte-Carlo, 3- 5 February 2010. IMAGINA, The European 3D Simulation and Visualisation Event centred on solutions which assist in designing and reaching decisions through visualisation and simulation.

[www.imagina.mc](http://www.imagina.mc) →

## Laval Virtual

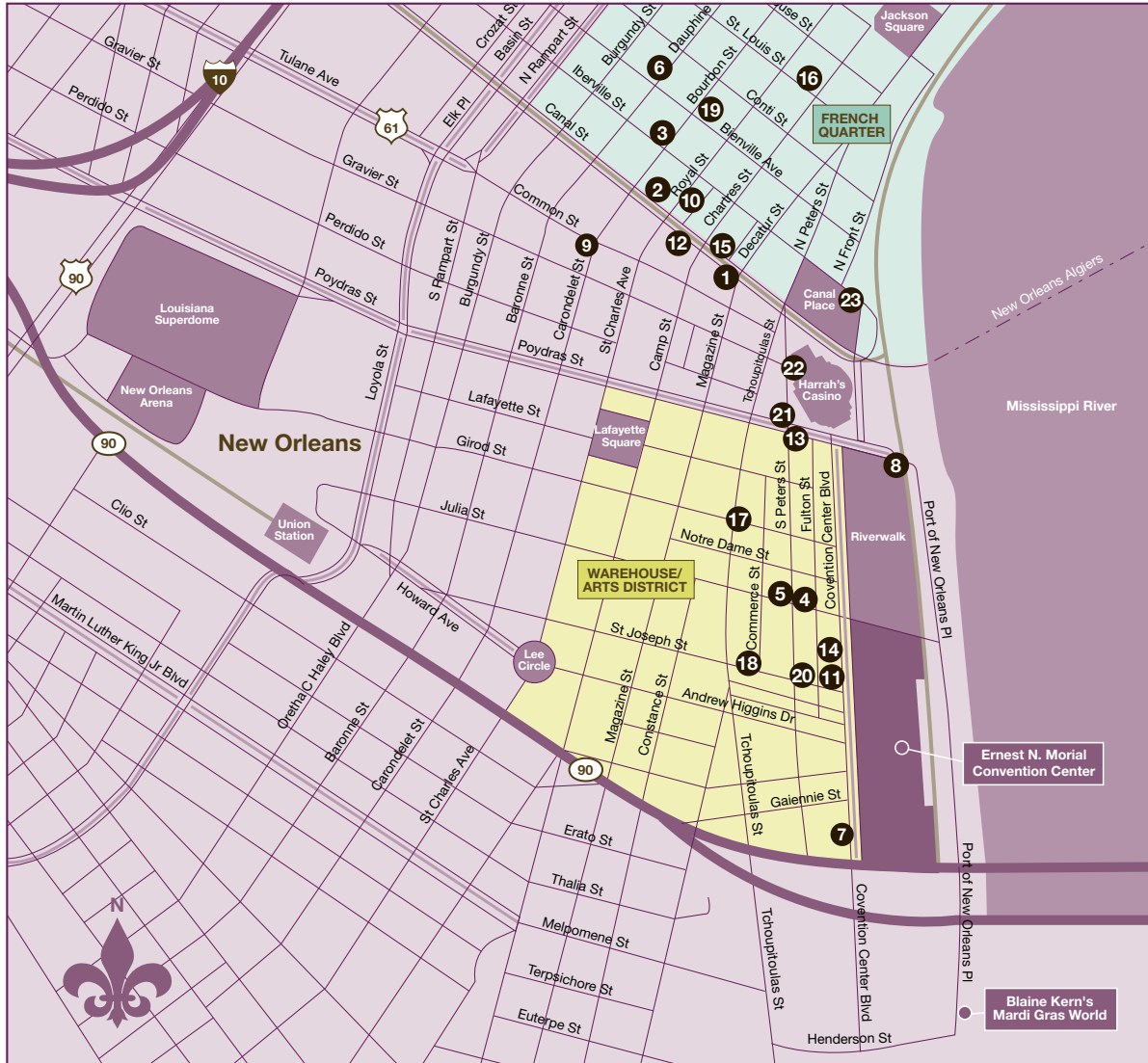
The 12th International Conference on Virtual Reality will be held on April 7-11, 2010, in Laval, France. First event in Europe dedicated to Virtual Reality, Realtime 3D and Interactive Techniques, Laval Virtual is where virtual reality users share their latest techniques from their fields of expertise.

[www.laval-virtual.org](http://www.laval-virtual.org) →

## Seoul International Cartoon & Animation Festival (SICAF)









SICAF focuses on the dynamic new-media environment and presents current trends in cartoons and animation through Exhibition Convention, Animated Film Festival and SPP Market.

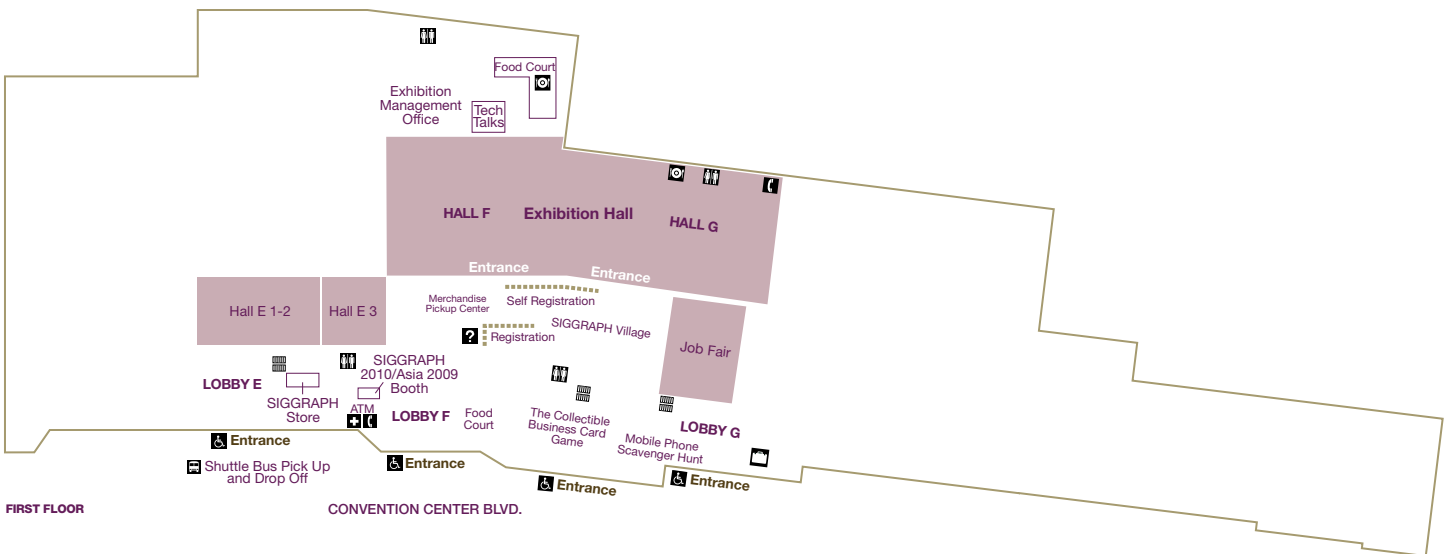
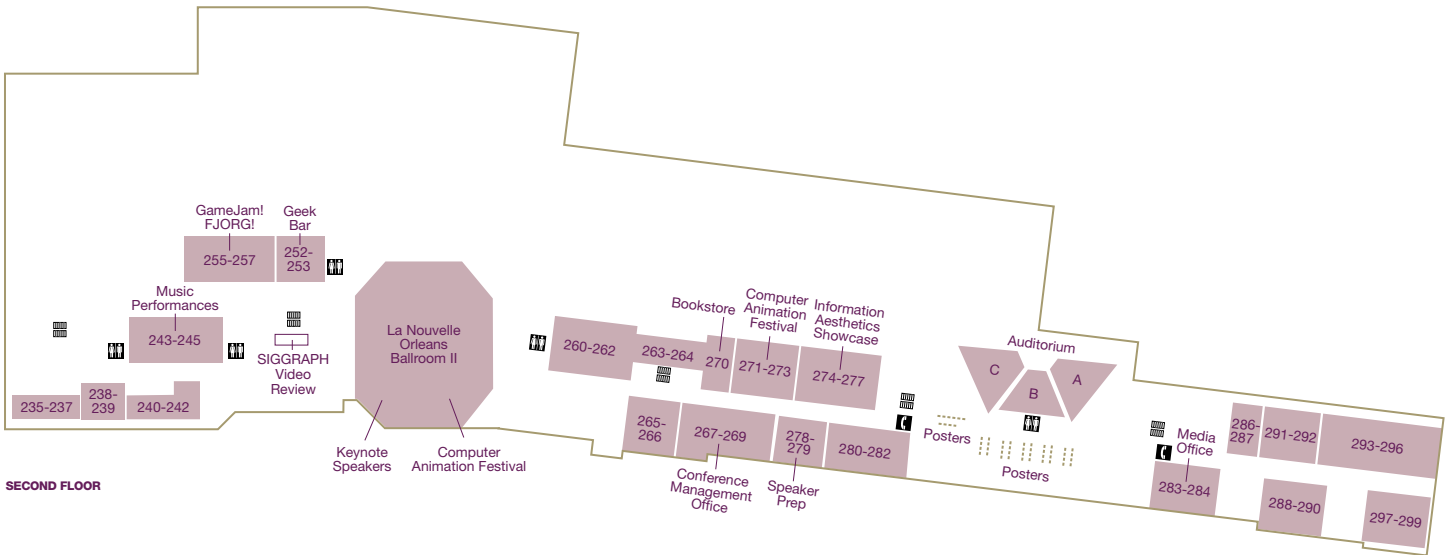
[www.sicaf.org](http://www.sicaf.org) →



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-  First Aid
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-  Handicap Access



# Special Thanks & Acknowledgements

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ArtServe Michigan  
IBM Watson Research Center  
Penn State Altoona  
University of Michigan

## BioLogic: A Natural History of Digital Life

ArtServe Michigan  
IBM Watson Research Center  
Next Generation Design Leaders Programme, supported by Korean Minis  
Penn State Altoona  
Philip Beesley Architect Inc.  
School of Art & Design, University of Michigan  
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INSIGHTS Toronto  
LAIKA Inc.  
Microsoft Corporation  
Noesis Interactive  
NVIDIA Corporation  
O'Reilly Media, Inc.  
Peachpit Press  
Pixar Animation Studios  
Pixologic, Inc.  
PL Studios, Inc.

PNY Technologies, Inc.  
Reel Exchange  
Rhythm & Hues Studios  
STTARR Project, Princess Margaret Hospital (UHN)  
The Gnomon School  
University College Dublin  
University of North Carolina at Chapel Hill  
University of Utah  
Wacom Co., Ltd.  
Walt Disney Animation Studios

## The Studio

3D Systems Corporation  
3Dconnexion, a Logitech company  
Adobe Systems Incorporated  
Albeton AG  
Animation, Inc.  
Apple Inc.  
Autodesk, Inc.  
AutoDesSys, Inc.  
Avid Technology, Inc.  
Bunkspeed  
Cakewalk, Inc.  
California College of the Arts  
Canon Inc.  
Celemony Software GmbH  
Cleveland Institute of Art  
Corel Corporation  
Cycling '74  
Eyeon Software  
Fender Musical Instruments Corporation  
Geomagic, Inc.  
Gibson USA  
GigaPan  
Hewlett-Packard Development Company, L.P.  
I-CubeX  
Image Content Technology LLC  
Intel Corporation  
Lenovo  
Materialise Group  
MAXON Computer  
Monterey Bay Aquarium Research Insitute  
Native Instruments GmbH  
NewTek, Inc.  
Next Engine  
Northeastern University  
Penn State Altoona  
Phase Space  
Pixologic, Inc.  
PL Studios, Inc.  
RDG Woodwinds  
Right Hemisphere  
Robert McNeel & Associates  
SensAble Technologies, Inc.  
Stanford University  
Stratasys, Inc.  
The Gnomon School  
Wacom Co., Ltd.  
X-Rite Incorporated

## Technical Papers

Disney Research  
Google  
Microsoft Corporation  
Princeton University