ADVANCE PROGRAMME

www.siggraph.org/asia2008

CONTENTS
2  Conference at a Glance
3  The Value of Attending SIGGRAPH Asia
4  Included with Your Registration
6  Conference Overview
10 Conference Schedule
17 Courses
26 Technical Papers
33 Educators Programme
39 Sketches & Posters
44 Exhibitor List
45 Co-located Workshops & Events
46 General Information
48 Committees
### Conference at a Glance

#### SIGGRAPH Asia 2008

**N E W  H O R I Z O N S**

#### Conference Registration Categories
- ★ Full Conference Access
- ● One-Day Full Conference
- ○ Basic Conference/Exhibits Plus
- E Exhibits Only

#### Conference Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>9 December</th>
<th>10 December</th>
<th>11 December</th>
<th>12 December</th>
<th>13 December</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Registration</strong></td>
<td>15:00–19:00</td>
<td>07:30–18:00</td>
<td>08:00–18:00</td>
<td>08:00–18:00</td>
<td>08:00–18:00</td>
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<tr>
<td><strong>Merchandise Pickup &amp; SIGGRAPH Asia Store</strong></td>
<td></td>
<td>07:30–18:00</td>
<td>08:00–18:00</td>
<td>08:00–18:00</td>
<td>08:00–18:00</td>
</tr>
<tr>
<td><strong>Reception</strong></td>
<td></td>
<td></td>
<td>Time and date to be confirmed. Updated information will be available on the web site.</td>
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<tr>
<td><strong>★ ○ Art Gallery Emerging Technologies</strong></td>
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<td>08:30–17:30</td>
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<tr>
<td><strong>★ ○ Computer Animation Festival</strong></td>
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<td>08:30–17:30</td>
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<tr>
<td><strong>★ ○ Animation Theatre Special Programme</strong></td>
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<td>08:30–17:30</td>
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<tr>
<td><strong>★ Electronic Theatre</strong></td>
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<td>19:00–21:00</td>
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<tr>
<td><strong>★ Courses</strong></td>
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<td>08:30–17:30</td>
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<tr>
<td><strong>★ Educators Programme</strong></td>
<td></td>
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<td></td>
<td>08:30–17:30</td>
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<tr>
<td><strong>★ ○ Posters</strong></td>
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<td>08:30–17:30</td>
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<tr>
<td><strong>★ Sketches</strong></td>
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<td>08:30–17:15</td>
</tr>
<tr>
<td><strong>★ Technical Papers</strong></td>
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<td>08:00–18:00</td>
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<tr>
<td><strong>★ Featured Speakers</strong></td>
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<tr>
<td><strong>★ ○ Fast Forward Session</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(Technical Papers and Sketches) 18:00–20:00</td>
</tr>
<tr>
<td><strong>★ ○ E Exhibition</strong></td>
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<td>09:30–18:30</td>
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<tr>
<td><strong>★ ○ E Exhibitor Tech Talks</strong></td>
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<td>10:00–18:00</td>
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<tr>
<td><strong>★ ○ Job Fair</strong></td>
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<td>09:30–18:30</td>
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</tbody>
</table>

*Conference schedule subject to change.*

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We understand the importance of convincing your employers to fund your attendance at SIGGRAPH Asia 2008. So we have developed the following value-based talking points for you to share with your boss.

**Value**

SIGGRAPH Asia 2008 is the place to be if you want to find the widest range of best-practice-based education in the region at one stop. This conference will significantly leverage your organisation’s training dollars.

**Industry Visionaries**

SIGGRAPH Asia 2008 gives you access to first-hand accounts from industry icons who were once in your shoes, about their achievements and where their visions and inspirations have taken them.

**Hands-On Knowledge**

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

**One-Stop Shopping**

SIGGRAPH Asia 2008 is your number-one opportunity to assess your options and opportunities in the world’s most dynamic digital media region. Singapore’s strategic location, its excellent facilities, and its fascinating diversity make it one of the world’s leading destinations for business.

**Personally Relevant Education**

In four information-packed days, SIGGRAPH Asia 2008 offers a very diverse range of educational sessions, so you can tailor a valuable personal education programme that is relevant to your organisation’s needs.

**Saves Time**

While four days out of the office might seem difficult, having to spend up to a year to amass the relevant information and education you could gain in four days would be downright daunting.

**Register Early and Afford More!**

If you register early for SIGGRAPH Asia 2008, you can reduce your organisation’s out-of-pocket costs and gain a more attractive return on investment.

**Inspiration**

After your SIGGRAPH Asia 2008 experience, you’ll return to work rejuvenated, with new knowledge and newly inspired creativity.

**Exchange**

SIGGRAPH Asia 2008 offers a powerful exchange of high-quality technical and creative information between Asia and the long-running SIGGRAPH conference in North America. This is your opportunity to participate in that exchange in real time.

**Community**

At SIGGRAPH Asia 2008, you will become an essential part of the SIGGRAPH community. Widen your network and bring your new connections back to your organisation.
Conference Registration Categories

★ Full Conference Access Pass
Includes admission to all programmes and events of SIGGRAPH Asia 2008. The Full Conference DVD-ROM and ticket for the SIGGRAPH Asia 2008 Reception are also included.

● Full Conference One-Day Access Pass
Includes admission to all programmes and events for one day of SIGGRAPH Asia 2008. Access to the Exhibition and Exhibitor Tech talks is included for three days, 11-13 December.

○ Basic Conference Access Pass/Exhibits Plus Pass
Includes admission to the Art Gallery and Emerging Technologies, the Animation Theatre, Posters, Technical Papers Fast Forward, the Exhibition, Exhibitor Tech Talks, and the Job Fair for all conference days. An Electronic Theatre ticket and the Full Conference DVD-ROM can be purchased separately.

E Exhibits Only Ticket
Exhibits Only admission is available only upon invitation from a SIGGRAPH Asia 2008 exhibitor. You must have received an invitation code in order to be eligible. Exhibits Only ticket includes admission to the Exhibition and Exhibitor Tech Talks only.

SIGGRAPH Asia 2008 Registration Fees
(in Singapore dollars)

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<th>★ Full Conference Access</th>
<th>On or before 31 Oct</th>
<th>After 31 Oct</th>
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<tr>
<td>ACM/ACM SIGGRAPH/ SIGCHI Member</td>
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<th>After 31 Oct</th>
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<tr>
<td>ACM/ACM SIGGRAPH/ SIGCHI Member</td>
<td>S$ 300</td>
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<th>○ Basic Conference</th>
<th>On or before 31 Oct</th>
<th>After 31 Oct</th>
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<tbody>
<tr>
<td>ACM/ACM SIGGRAPH/ SIGCHI Member</td>
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<td>S$ 75</td>
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<tr>
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★ ● ○ Art Gallery
★ ● ○ Computer Animation Festival
★ ● ● Electronic Theatre
★ ● ○ Animation Theatre
★ ● ● Courses
★ ● ○ Exhibitors Programme
★ ● ○ Emerging Technologies
★ ● ○ ● E Exhibition
★ ● ○ E Exhibitor Tech Talks
★ ● ○ Fast Forward Session
★ ● ○ Technical Papers
★ ● ○ Fast Forward Sketches
★ ● ○ Featured Speakers
★ ● ○ Job Fair
★ ● ○ Posters
★ ○ Reception
★ ● ○ Special Sessions
★ ○ Sketches
★ ● Technical Papers
★ ● Full Conference DVD-ROM
Included with Your Registration: Technical Materials

Printed Materials

NOT included with any registration category. Printed materials are available for purchase at SIGGRAPH Asia 2008.

ACM Transactions on Graphics (Conference Proceedings Special Issue)

ACM Transaction on Graphics (TOG) is the foremost peer-reviewed journal in the graphics field. All papers presented at SIGGRAPH Asia 2008 will be published in this special issue of TOG.

Digital Experiences

The permanent record of images from the Art Gallery, the Computer Animation Festival, and Emerging Technologies.

Full Conference DVD-ROM

Included with Full Conference Access registration, and available for purchase at SIGGRAPH Asia 2008.

This digital publication contains the electronic version of the Technical Papers, including images and supplemental material; the Course notes, including supplemental materials (movies, source code, HTML presentations); and abstracts and supplemental materials from the Educators Programme, Sketches, and Posters. The content of the printed version of the ACM Transactions on Graphics (Conference Proceedings Special Issue) and the Digital Experiences: the SIGGRAPH ASIA 2008 Art Gallery, Emerging Technologies, and Computer Animation Festival Catalogue are also included on the Full Conference DVD-ROM.
See, Hear, and Interact

The first SIGGRAPH Asia convenes in Singapore, 10-13 December 2008, for four full days of world-class technical presentations, creative exploration, and the industry’s largest Asian marketplace of products and services: the SIGGRAPH Asia 2008 Exhibition.

★  11 December 10:30

Featured Speaker:

Don Greenberg
Director
Cornell University
Program of Computer Graphics
Computer Graphics Pioneer

The Expanding Boundaries of Computer Graphics

Don Greenberg challenges the new generation of computer graphicists (those who will take great professional risks to solve big problems) to dream impossible dreams and extend the influence of computer graphics to many other disciplines.

Don Greenberg has been researching and teaching in the field of computer graphics for more than 40 years. His primary focus has been on advancing the state of the art in computer graphics.

His current computer science research projects involve realistic image generation, parallel processing algorithms for rendering, new graphical user interfaces, and computer animation. His current application projects include ornithology and the search for the ivory-billed woodpecker, medical imaging and virtual surgery, architectural design for a green environment, and new types of computer displays, from electronic paper to touch-sensitive table displays.

He has taught courses in computer graphics in computer science, computer-aided design in architecture, computer animation in art, and technology strategy for business. Many of his graduate students have gone on to become leaders in the fields of computer graphics, computer animation, and computer-aided design for architecture. Six former students have won Hollywood’s Technical Oscars, and five have won the prestigious SIGGRAPH Achievement Award.
Behind the Scenes at Pixar

This talk takes you behind the scenes at Pixar Animation Studios for a look at how its 3D computer graphics films are made. The process starts with development of the story and continues with modelling the geometry, animating the characters, simulating things like water and cloth and hair, defining the look of the surfaces, putting lights in the scene, and rendering the images. Making a computer animated film requires close collaboration between artists and technical experts in many areas of expertise and is a great example of the value of bringing different disciplines together.

Rob Cook was the co-architect and primary author of Pixar’s RenderMan software, which creates photo-realistic computer images. In 2001, he received an Oscar for his contributions, the first Academy Award ever given for software. In the last 10 years, every film nominated for a Visual Effects Academy Award has used RenderMan.

He has a Bachelor of Science degree in physics from Duke University and a Master of Science degree in Computer Graphics from Cornell University. At Cornell, he worked on simulating realistic surfaces, taking computer-generated images beyond the distinctive plastic look they had at the time. In 1981, he joined Lucasfilm/Pixar, where he developed the first programmable shader, which is now an essential part of GPUs and game engines.

He was the first to use Monte Carlo techniques in computer graphics, which was essential for simulation of complex, realistic lights and camera effects. His camera techniques were especially important in the visual effects industry, because they allowed computer-generated imagery to match the motion blur and depth of field of live-action footage when the two were combined.

In 1987, he received the ACM SIGGRAPH Achievement Award in recognition of these contributions.
Conference Overview

CONFERENCE REGISTRATION CATEGORIES
★ Full Conference Access
● One-Day Full Conference
○ Basic Conference/Exhibits Plus
E Exhibits Only

Art Gallery/ Synthesis
★ ● ○

The SIGGRAPH Asia 2008 Art Gallery presents art that transforms, melds, and transcends current Asian paradigms. This international, multicultural festival of creativity showcases work in all media— including “hybrid” formats such as text-literature collaborations, ubiquitous sounds, and zero-gravity space art—that provokes contemplation, explores surprising ideas, addresses contemporary issues, interactively engages viewers in discovery, and stimulates their intellect and creativity.

Computer Animation Festival
Electronic Theatre ★ ●
Animation Theatre ★ ● ○

The first edition of the SIGGRAPH Asia Computer Animation Festival illuminates a new horizon of animation and visual effects from around the world:

Juried Programmes

Electronic Theatre
A very popular feature of the SIGGRAPH conference for many years, the Electronic Theatre offers some of the world’s most remarkable work selected by a distinguished international jury. In addition, works presented in the Electronic Theatre are eligible for festival prizes. The Best of Show and Jury Awards will be announced during SIGGRAPH Asia 2008.

Animation Theatre
An intriguing collection of innovative achievements in all genres of animation and visual effects.

Invited Screenings
School Showcase of promising student work, Studio Specials from the world’s leading animation and visual effects experts, and the Best of SIGGRAPH Award Winners from previous Computer Animation Festivals. Plus a Special Programme of the latest and greatest animation techniques and visual effects. The festival also features Festival Talks and other events.

Courses
★ ●

International experts present instructional sessions on every aspect of computer graphics and interactive techniques: animation, computer-human interaction, entertainment, gaming, scientific visualisation, recent breakthroughs, cool programming adventures, and more.

Educators Programme
★ ●

Envisioned as an international gathering of industry professionals and academics, the Educators Programme presents perspectives that appeal to a wide spectrum of interests. The goal is to share educational strategies adopted in both industry and academia to make the learning process more satisfying, productive, and meaningful.

 Emerging Technologies
★ ● ○

SIGGRAPH Asia 2008 Emerging Technologies presents an Asian paradigm shift, a rich resource of delicate, aesthetic technologies and vivid, innovative ideas. Interactive, mind-expanding explorations in virtual and mixed reality, haptic interfaces, ubiquitous systems, digital tools, HD displays, robotics, and more. Emerging Technologies presents demos and installations of technologies that define the future of computer graphics and interactive techniques.

Exhibition
★ ● ○ E

All the products and services you need for another year of creative achievement. Try the latest systems, talk with the people who developed them, and get all the information you need to make budget and purchase decisions.

Thursday, 11 December 09:30–18:30
Friday, 12 December 09:30–18:30
Saturday, 13 December 09:30–18:30

http://www.siggraph.org/asia2008
Product updates and detailed, hands-on presentations that introduce attendees to the latest developments in product innovation. In these sessions, SIGGRAPH Asia 2008 exhibitors give product updates; introduce their latest developments; demonstrate software, hardware, and systems; answer questions; and talk about how their applications improve professional and technical performance.

SIGGRAPH Asia 2008 has partnered with CreativeHeads.net to produce a best-in-class job fair! Employers and creative professionals will be able to connect months before and after the conference via the CreativeHeads.net web site, and during the conference via the actual job fair.

Thursday, 11 December 09:30–18:30
Friday, 12 December 09:30–18:30
Saturday, 13 December 09:30–18:30

Learn how the industry is evolving worldwide and collaborate with attendees from five continents.

The International Centre offers informal translation services and space for meetings, talks, and demonstrations. Throughout the year, the International Resources programme facilitates worldwide collaboration in the SIGGRAPH community, provides an English Review Service for SIGGRAPH and SIGGRAPH Asia to help submitters whose first language is not English, and encourages participation in all conference venues, activities, and events.

Thursday–Saturday, 11–13 December

Social and intellectual interaction with the movers and shakers of the international SIGGRAPH community.

Touch base with the people you need to know for another year of business, professional success, and adventure.

A dynamic forum for thought-provoking, speculative ideas, novel applications, what-if concepts, and behind-the-scenes production details. Following each sketch presentation, authors discuss future implications of their work and answer audience questions.

Graphic depictions of incremental or half-baked but innovative ideas displayed throughout the week with scheduled sessions for informal discussions.

The SIGGRAPH Asia 2008 Technical Papers programme is a premier international forum for disseminating provocative and important new work in computer graphics and interactive techniques. Leading international experts from Asia and beyond present peer-reviewed research in rendering, modelling, animation, human-computer interaction, computer-aided design, virtual reality, and visualisation.

ACM SIGGRAPH’s first back-to-back Technical Papers and Sketches Fast Forward Session. Get a preview of the latest research in computer graphics and interactive techniques and select the Technical Papers and Sketches that you need to attend later in the week.
Wednesday, 10 December

**SESSION 1 08:30–10:15**

**COURSES**

- Introduction to Computer Graphics (Part I)
- An Introduction to Programming with OpenGL and OpenGL ES (Part I)
- Scattering (Part I)
- Interactive Massive Model Rendering (Part I)
- Pixar's RenderMan (Part I)*

**SESSION 2 10:30–12:15**

**COURSES**

- Introduction to Computer Graphics (Part II)
- An Introduction to Programming with OpenGL and OpenGL ES (Part II)
- Scattering (Part II)
- Interactive Massive Model Rendering (Part II)
- Pixar's RenderMan (Part II)

* This course is strictly limited to 25 attendees. Please refer to the registration instruction details on page 17.

**SESSION 3 13:45–15:30**

**COURSES**

- An Introduction to Programming with OpenGL and OpenGL ES (Part III)
- Light Interaction with Human Skin: From Believable Images to Predictable Models (Part I)
- Interactive Massive Model Rendering (Part III)
- Pixar's RenderMan (Part III)

**SESSION 4 15:45–17:30**

**COURSES**

- An Introduction to Programming with OpenGL and OpenGL ES (Part IV)
- Light Interaction with Human Skin: From Believable Images to Predictable Models (Part II)
- Interactive Massive Model Rendering (Part IV)
- Pixar's RenderMan (Part IV)
- There Can Be Only One: Independent Animation for the Lonely

**SESSION 5**

18:00–20:00

**FAST FORWARD SESSION**

ACM SIGGRAPH's first back-to-back Technical Papers and Sketches Fast Forward Session. Get a preview of the latest research in computer graphics and interactive techniques and select the Technical Papers and Sketches that you need to attend later in the week.
**Thursday, 11 December**

### COURSES

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<tr>
<th>08:30–10:15</th>
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<tbody>
<tr>
<td>None</td>
<td>Methodologies in Learning</td>
<td>GPU-Based Methods</td>
<td>Shape Modelling</td>
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<tr>
<td></td>
<td>Session Chair: Mark Chavez</td>
<td>Session Chair: Edward Angel</td>
<td>Session Chair: Tao Ju</td>
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<tr>
<td></td>
<td>• Computer Graphics in Context: An Approach to a First Course in Computer Graphics</td>
<td>• GPU Crowd Simulation</td>
<td>• Single Image Tree Modelling</td>
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<td></td>
<td>• Using Augmented Reality to Promote The Understanding of Materials Science to School Children</td>
<td>• GPU-Based Scene Management for Rendering Large Crowds</td>
<td>• Sketch-based Tree Modelling Using Markov Random Field</td>
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<td></td>
<td>• Simulating Educational Physical Experiments in Augmented Reality</td>
<td>• GPU Tessellation for Detailed, Animated Crowds</td>
<td>• Space-Time Surface Reconstruction Using Incompressible Flow</td>
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### FEATURED SPEAKER SESSION 10:30–12:00

**FEATURED SPEAKER:** DON GREENBERG

### SESSION 1

**08:30–10:15**

- **EDUCATORS PROGRAMME**
  - Professional/Academic Programme
  - Session Chair: Se-hyung Park
  - Welcome and Overview of Programme
- **SKETCHES**
  - Lucasfilm
  - Session Chair: Ken Ariyo
- **TECHNICAL PAPERS**
  - Character Animation I
  - Session Chair: Subodh Kumar
  - • Animating Responsive Characters with Dynamic Constraints in Near-Unactuated Coordinates
  - • Synthesis of Constrained Walking Skills
  - • Interaction Patches for Multi-Character Animation
  - • Motion Overview of Human Actions

### SESSION 3

**13:45–15:30**

- **EDUCATORS PROGRAMME**
  - Professional/Academic Programme
  - Session Chair: Se-hyung Park
  - Welcome and Overview of Programme
- **SKETCHES**
  - Lucasfilm
  - Session Chair: Ken Ariyo
- **TECHNICAL PAPERS**
  - Character Animation I
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**FEATURED SPEAKER SESSION 10:30–12:00**

**FEATURED SPEAKER:** DON GREENBERG
### Conference Schedule

**Thursday, 11 December**

<table>
<thead>
<tr>
<th>COURSES</th>
<th>EDUCATORS PROGRAMME</th>
<th>SKETCHES</th>
<th>TECHNICAL PAPERS</th>
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<tr>
<td>• Real-Time Individualized Virtual Humans (Part II)</td>
<td>Methodologies In Learning</td>
<td>Interactive Techniques</td>
<td>Fun With Single Images</td>
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<tr>
<td>• Multiperspective Modelling, Rendering, and Imaging</td>
<td>Session Chair: Martin Constable</td>
<td>Session Chair: Matt Adcock</td>
<td>Session Chair: Sing Bing Kang</td>
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<tr>
<td>• Mesh Parameterisation: Theory and Practice (Part II)</td>
<td>• Making Intelligent Sounds</td>
<td>• Balance Ball Interface</td>
<td>• Deep Photo: Model-based Photograph Enhancement and Viewing</td>
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<tr>
<td>• Introduction to Computer Graphics Shaders with glman (Part II)</td>
<td>• Shift to The Third Space - isAT 2008</td>
<td>• Fu-Fuu: An Interactive Game using Breath Control</td>
<td>• Animating Animal Motion from Still</td>
</tr>
<tr>
<td></td>
<td>• The Solution of Indie-Creation on Network</td>
<td>• Tracking the Position of a Mobile Device on Interactive Screens with RFID</td>
<td>• Optimised Scale-and-Stretch for Image Resizing</td>
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<tr>
<td></td>
<td></td>
<td>• Bear’s Beer and Smart Platter—Handheld Interactive Haptic Display</td>
<td>• Depicting Procedural Caustics in Single Images</td>
</tr>
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**SESSIon 4**

15:45–17:30 | 15:45–17:30 | 15:45–17:15 | 15:45–18:00

- Methodologies In Learning
- Interactive Techniques
- Fun With Single Images

- Making Intelligent Sounds
- Balance Ball Interface
- Deep Photo: Model-based Photograph Enhancement and Viewing

- Shift to The Third Space - isAT 2008
- Fu-Fuu: An Interactive Game using Breath Control
- Animating Animal Motion from Still

- The Solution of Indie-Creation on Network
- Tracking the Position of a Mobile Device on Interactive Screens with RFID
- Optimised Scale-and-Stretch for Image Resizing

- Bear’s Beer and Smart Platter—Handheld Interactive Haptic Display
- Depicting Procedural Caustics in Single Images
### SESSION 1

<table>
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<tr>
<th>COURSES</th>
<th>SKETCHES</th>
<th>TECHNICAL PAPERS</th>
<th>TECHNICAL PAPERS</th>
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<tr>
<td>Discrete Differential Geometry: An Applied Introduction (Part I)</td>
<td>Education</td>
<td>Character Animation II</td>
<td>Lighting, Shading &amp; GPUs</td>
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<td>Beyond Programmable Shading (Part I)</td>
<td>Arts And Robots</td>
<td>Session Chair: Doug James</td>
<td>Session Chair: Nelson Max</td>
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<td>Seeing in 3D (Part I)</td>
<td>Shadow Play</td>
<td>Facial Performance Synthesis Using Deformation-Driven Polynomial</td>
<td>• Real-time KD-Tree Construction on Graphics Hardware</td>
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<td>Automatic Composition for Contemporary Dance Sequences</td>
<td>• Reusable Skinning Templates Using Cage-Based Deformations</td>
<td>• Automated Reprojection-based Pixel Shader Optimisation</td>
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<td>Nervixxx: An Introduction of Biosignal to Live Video Performance</td>
<td>• Accelerometer-based User Interfaces for the Control of a Physically Simulated Character</td>
<td>• Fast, Realistic Lighting and Material Design Using Nonlinear Cut Approximation</td>
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<td>Rendering Lots of Robots</td>
<td>• Video Puppetry: A Performative Interface for Cutout Animation</td>
<td>• Imperfect Shadow Maps for Efficient Computation of Indirect Illumination</td>
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<td>Beyond Programmable Shading (Part II)</td>
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<td>Seeing in 3D (Part II)</td>
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<td>Practice Project Management in Website Design: An Experiential Learning Simulation</td>
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<td>Guitar Man</td>
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### SESSION 2

<table>
<thead>
<tr>
<th>COURSES</th>
<th>SKETCHES</th>
<th>TECHNICAL PAPERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discrete Differential Geometry: An Applied Introduction (Part II)</td>
<td>Photographs and Drawings</td>
<td>Image-Based Capture</td>
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<tr>
<td>Beyond Programmable Shading (Part II)</td>
<td>Session Chair: Diego Gutierrez</td>
<td>Session Chair: Chi-Keung Tang</td>
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<tr>
<td>Seeing in 3D (Part II)</td>
<td>Forward Lean – Deriving Motion Illustrations from Video</td>
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<td>Automatic 3D Caricature Generation By Learning in enlarged Manifold Space</td>
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<td>Visualizing Adaptive Clusters of Digital Photographs</td>
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<td>Clean up Your Image Using Internet Photo Collections</td>
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<td>Shield Fields: Modelling and Capturing 3D Occluders</td>
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<td>Time-Resolved 3D Capture of Non-Stationary Gas Flows</td>
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<td>A Photometric Approach for Estimating Normals and Tangents</td>
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<td>Extracting Depth and Matte Using a Colour-Filtered Aperture</td>
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</tbody>
</table>
FEATURED SPEAKER SESSION  13:30–15:00

FEATURED SPEAKER: ROB COOK

SESSION 3  
13:45–15:30

COURSES

• Discrete Differential Geometry: An Applied Introduction (Part III)
• Beyond Programmable Shading (Part III)
• Seeing in 3D (Part III)

EDUCATORS PROGRAMME

None

SKETCHES

Curves, Planes, and Terrains
Session Chair: Olga Sorkine

TECHNICAL PAPERS

Texture
Session Chair: Johannes Kopf

• Random-Access Rendering of General Vector Graphics

• Texture Amendment: Reducing Texture Distortion in Constrained Parameterisation

• IGT: Inverse Geometric Textures

• A Psychophysically Validated Metric for Bidirectional Texture Data Reduction

SESSION 4  
15:45–17:30

COURSES

• Discrete Differential Geometry: An Applied Introduction (Part IV)
• Beyond Programmable Shading (Part IV)
• Seeing in 3D (Part IV)

EDUCATORS PROGRAMME

Methodologies in Learning
Session Chair: Russell Pensyl

SKETCHES

Volumes
Session Chair: Baoquan Chen

TECHNICAL PAPERS

Reflectance & Subdivision
Session Chair: Kun Zhou

• Practical Modelling and Acquisition of Layered Facial Reflectance

• A Layered Heterogeneous Reflectance Model for Acquiring and Rendering Human Skin

• Phong Tessellation

• Subdivision Shading

• Real-Time Reyes-Style Adaptive Surface Subdivision

## SESSION 1
08:30–10:15

### COURSES

- **EDUCATORS PROGRAMME**
  - Advanced Illumination Techniques for GPU-Based Volume Ray Casting (Part I)
  - Developing Augmented Reality Applications (Part I)
  - Deconstructing an Old Master Painting Using Photoshop’s Advanced Toolset
  - Using Animation and Interactive Virtual Technology to Create Interpretive Materials for Museum Learning and Promotion
  - Chinese Whispers

- **SKETCHES**
  - Visual Simulation Session Chair: Geoff Wyvill
  - Visual Simulation of Scattering and Settling of Fine Particles
  - A Visual Simulation for Gold Leaf and Japanese Lacquerware
  - Fire Simulation and Rendering for “Hellboy 2: The Golden Army”
  - Interactive Simulation of the Process of Glottal Wave Generation Using a GPU

- **TECHNICAL PAPERS**
  - Mesh Processing Session Chair: Olga Sorkine
  - Efficient Traversal of Mesh Edges Using Adjacency Primitives
  - Randomised Cuts for 3D Mesh Analysis
  - Deduce Interpolating Subdivision Schemes from Approximating Subdivision Schemes
  - Quadrilateral Mesh Simplification

## SESSION 2
10:30–12:15

### COURSES

- **EDUCATORS PROGRAMME**
  - Advanced Illumination Techniques for GPU-Based Volume Ray Casting (Part II)
  - Developing Augmented Reality Applications (Part II)
  - Pedagogy in Action Session Chair: Lucy Petrovic
  - Incorporating Animation Technologies into Tools for Colonial American Education
  - Wireless Sensor Network to Support Multiple-Student Group Learning Game with One PC in Classroom

- **SKETCHES**
  - Lighting and Reflectance Session Chair: Wojciech Jarosz
  - B-Spline Volume vs. Other BRDF Models
  - SPARTA: A Scalable Architecture for Ray-Tracing Applications
  - Spatial-Directional Radiance Caching
  - Fast, Approximate HDR Image-Based Lighting Using Summed-Area Tables

- **TECHNICAL PAPERS**
  - Non-Photorealistic Rendering Session Chair: Ken Anjyo
  - Adaptive Cutaways for Comprehensible Rendering of Polygonal Scenes
  - Richness-Preserving Manga Screening
  - Line-Art Illustration of Dynamic and Specular Surfaces
  - Demarcating Curves for Shape Illustration
## SESSION 3

<table>
<thead>
<tr>
<th>Time</th>
<th>COURSES</th>
<th>EDUCATORS PROGRAMME</th>
<th>SKETCHES</th>
<th>TECHNICAL PAPERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:45–15:30</td>
<td>Interactive Introduction to X3D Graphics (Part I)</td>
<td></td>
<td>Session Chair: Craig Donner</td>
<td>Session Chair: Xin Tong</td>
</tr>
<tr>
<td>13:45–15:15</td>
<td>• Image-Correction Method for Multi-Projector Display Using SIFT Features</td>
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<td>• Continuous Model Synthesis</td>
<td>• Interactive 3D Architectural Modelling From Unordered Photo Collections</td>
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<tr>
<td>13:45–15:15</td>
<td>• Gloss and Normal Map Acquisition Using Gray Codes</td>
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<td>• Interactive Example-Based Urban Layout Synthesis</td>
<td>• Interactive Example-Based Urban Layout Synthesis</td>
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<td>• Considering Shape Reconstruction From Specular Reflection</td>
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<td>• Image-based Façade Modelling</td>
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<td>• Image-Based Roughness Modelling Using Perlin Noise</td>
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</tbody>
</table>

## SESSION 4

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<tr>
<th>Time</th>
<th>COURSES</th>
<th>EDUCATORS PROGRAMME</th>
<th>SKETCHES</th>
<th>TECHNICAL PAPERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:45–15:30</td>
<td>Modern OpenGL: Its Design and Evolution (Part II)</td>
<td>Professional/Academic</td>
<td>None</td>
<td>Physicaly Based Animation</td>
</tr>
<tr>
<td>13:45–15:30</td>
<td>Interactive Introduction to X3D Graphics (Part II)</td>
<td>Pan Zhigeng</td>
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<td>Session Chair: Hyeong-Seok Ko</td>
</tr>
<tr>
<td>13:45–15:30</td>
<td>• Teaching 3D animation: the Balance between Creative versus Technical Skills</td>
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<td>• Magnets in Motion</td>
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<tr>
<td>13:45–15:30</td>
<td>• Computer Games Degrees in the UK: A Review of Current Practice</td>
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<td></td>
<td>• Real-Time Control of Physically Based Simulations Using Gentle Forces</td>
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<tr>
<td>13:45–15:30</td>
<td>• From Motion Capture to Interactive Animation</td>
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<td>• Staggered Projections for Accurate Frictional Contact in Multibody Systems</td>
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<tr>
<td>15:45–17:30</td>
<td>• From Motion Capture to Interactive Animation</td>
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<td>• Optimising Cubature for Efficient Integration of Subspace Deformations</td>
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<tr>
<td>15:45–17:30</td>
<td>• Magnets in Motion</td>
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<td>• Fast Animation of Turbulence Using Energy Transport and Procedural Synthesis</td>
</tr>
</tbody>
</table>
International experts present instructional sessions on every aspect of computer graphics and interactive techniques: animation, computer-human interaction, entertainment, gaming, scientific visualization, recent breakthroughs, cool programming adventures, and more.

These unique educational opportunities are only available at SIGGRAPH Asia 2008.

Wednesday, 10 December

PIXAR’S RENDERMAN

★ ●
Wednesday, 10 December
09:00–17:00
Level: Beginner

Attendance for this course is limited to 25 persons.

Attendance is on a first-come, first-served basis. Attendees who are interested in this session are required to join a dedicated queue labelled Pixar’s RenderMan Course at Level 1, Registration Counter, Suntec Singapore International Convention and Exhibition Centre. The first 25 persons in this queue with their registration badges already collected will be allowed to attend the course. If you are hoping to attend this course, you are strongly advised to collect your registration badge the day before.

Transportation will be provided to the offsite computer laboratory where this course is presented, and at the end of the course, a return trip back to the convention centre.

Departure time is 08:15, Wednesday, 10 December.

If you are hoping to attend this course, you are strongly advised to collect your registration badge the day before.

An overview of:

• The structure of RenderMan scene descriptions
• The implementation and application of custom shaders
• The use of RenderMan for Maya Pro

This full-day course is an intensive, hands-on practical introduction to the RenderMan system and Pixar’s RenderMan, a high-quality renderer that is widely used in the animation and digital effects industry.

In the first part of the course, attendees gain sufficient familiarity with RenderMan’s scene description protocol to enable them to edit and manipulate RIB files. RIB files enable modelling and animation applications to communicate with Pixar’s RenderMan.

The second part of the course introduces the use of the RenderMan Shading Language (RSL). Attendees are not expected to have prior programming experience. The intention is to provide an overview of the creative potential of the shading language to the point where attendees will be confident to continue creating their own custom shaders with RSL. During the final part of the course, attendees use Pixar’s high-end product, RenderMan Studio, in conjunction with AutoDesk’s Maya. Prior experience with Maya will be advantageous, but it is not required.

PREREQUISITES
None

INSTRUCTOR
Malcolm A. Kesson
Savannah College of Art and Design

INTRODUCTION TO COMPUTER GRAPHICS

★ ● ○
Wednesday, 10 December
08:30–12:15
Level: Beginner

This course is open to attendees in three registration categories: Full Conference Access, One-Day Full Conference, and Basic Conference/Exhibits Plus. All other courses require Full Conference registration.

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

This course is designed to ease newcomers into the SIGGRAPH Asia 2008 experience by presenting the fundamental concepts and vocabulary at a level that can be readily understood. Far from being made up of dry facts, this course also portrays the fun and excitement that led most of us to the SIGGRAPH conference in the first place. After the course, attendees will be well-prepared to understand, appreciate, enjoy, network in, and learn from the rest of the SIGGRAPH Asia experience.

PREREQUISITES
A basic understanding of computers and algebra.

Courses

INTENDED AUDIENCE
The complete newcomer who wants to learn some of the basic terms and concepts in computer graphics, and receive some guidance on how to get the most out of attending SIGGRAPH Asia 2008.

INSTRUCTORS
Mike Bailey
Oregon State University
Steve Cunningham
Brown Cunningham Associates

FINDING YOUR PLACE IN DIGITAL PRODUCTION
★
Wednesday, 10 December
13:45–15:30
Level: Beginner

Deciding to pursue a job in digital production is easy for many people, but once you’ve decided that you want to help produce animation, visual effects, and video games, and you’ve completed the relevant training, then what? The process of preparing material to present to a potential employer can be nerve wracking and confusing. Many aspiring artists put together a demo reel before even considering what jobs they might apply for.

This tutorial presents an inside view of what the industry expects from a candidate’s show reel, portfolio, and résumé, and the simple steps artists can take to live up to those expectations. While there is quite a bit of information available about the mechanics of putting together a demo reel and résumé, those details are not very useful if you don’t know what purpose your reel will be serving.

There is intense competition for digital production jobs, and just having a reel with some animation or modelling on it is no longer all it takes to land an interview. Industry veterans Tad Leckman and Patricia Kung share their experiences reviewing reels and résumés, and preparing young artists for careers in digital media. They also show and analyse examples of effective demo reel.

PREREQUISITES
Basic understanding of CG terminology.

INTENDED AUDIENCE
Students, new graduates, and individuals with production experience who are thinking about their next move. This tutorial is also useful for educators, parents, and recruiting professionals.

INSTRUCTORS
Tad Leckman
Lucasfilm Animation Singapore
Patricia Kung
Animal Logic

INTERACTIVE MASSIVE MODEL RENDERING
★
Wednesday, 10 December
08:30–17:30
Level: Intermediate

Users consistently try to manage and display more data than any computing system allows, especially when they work with 3D models for films, games, CAD systems, medical imaging, seismic exploration, information spaces, etc. In this course, seven international researchers and practitioners present software and hardware strategies for real-time visualization of and interaction with massive models.

Even when they work with higher-performance computing systems, game and entertainment producers use a set of techniques to limit model size during real-time visualization and interaction sessions. However, polygon decimation, texture maps, and related techniques do not readily apply to domains where high levels of visual accuracy are essential. Such models can contain a billion polygons or voxels and millions of individually selectable objects.

Although the course addresses ray tracing and rasterization, its objective is to explore a systems approach. It focuses on system integration and optimization techniques that let extract higher performance, such as:

- Software techniques to overcome performance and memory size limitations (kd-trees, occlusion culling, LODs, multi-threaded programming, memory-mapped files, display lists, cache coherence).
- Computing system architecture (parallel-processor architectures, single and multi-GPU hardware, thin client, hardware occlusion culling, cell computers, multi-core CPUs).
- Scalable system architecture (preprocessing, large user communities, model-configuration management, network transfer of basic geometry, variable form-factor display devices).

The course summarizes overall performance-improvement strategies, gives examples of industrial and academic approaches using both rasterization and ray tracing, and concludes with real-world experience in a commercial environment.

PREREQUISITES
General knowledge of the difference between ray tracing and rasterization. Familiarity with computing-system architecture, graphics hardware, and parallel processing.

INTENDED AUDIENCE
This course is intended for users of complex models and practitioners who build real-time 3D applications. The techniques are applicable to any community that commonly reduces model detail (games, for example) or works only with model chunks (CAD, for example).

INSTRUCTORS
Enrico Gobbetti
Center for Advanced Studies, Research and Development in Sardinia
Philipp Slusallek
Universität des Saarlandes
Andreas Dietrich
NVIDIA Research
Marco Agus
Center for Advanced Studies, Research and Development in Sardinia
Renato Pajarola
Universität Zürich
Sung-eui Yoon
Korea Advanced Institute of Science and Technology

AN INTRODUCTION TO PROGRAMMING WITH OPENGL AND OPENGL ES
★
Wednesday, 10 December
08:30–17:30
Level: Beginner

OpenGL, and its derivative API OpenGL ES, are among the most widely available...
programming libraries for computer graphics applications, and are used for almost every discipline of computer graphics: research, scientific visualisation, entertainment and visual effects, computer-aided design, interactive gaming, and many more. This course provides an accelerated introduction to creating applications using the OpenGL application-programming interfaces (API). It covers fundamental topics such as modelling, lighting, depth buffering, and texture mapping, and introduces advanced topics such as using vertex and fragment shaders.

The course introduces OpenGL’s operation through more than just code snippets and static images. It utilizes several applications that introduce various subsets of the OpenGL API (for example, lighting or texture mapping). And it includes tutorials that allow attendees to interactively modify the values passed into OpenGL and immediately see the resulting images.

Topics include how OpenGL represents geometric objects; how lighting, texture mapping, anti-aliasing, and other supported features are applied; and how to use pixel images, both in elementary image processing and imagery for texture maps. The OpenGL Shading Language (GLSL) is introduced using both vertex and fragment programs. Advanced topics, whose scope precludes a detailed discussion in an introductory class, are introduced with references for further study.

**PREREQUISITES**

Ability to read simple programs written in the C language. No previous experience writing graphics programs is required. Knowledge of basic concepts from linear algebra (vector notation and matrix multiplication) is useful but not required.

**INTENDED AUDIENCE**

Novice graphics programmers who want to learn how to author interactive, 3D, graphics applications using OpenGL and OpenGL ES.

**INSTRUCTORS**

Dave Shreiner
ARM, Inc.

Ed Angel
University of New Mexico

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**SCATTERING**

⭐ ●

**Wednesday, 10 December**

**08:30–12:15**

**Level: Intermediate**

A taxonomy of scattering phenomena and how to treat them efficiently, by leveraging the wealth of knowledge from computer graphics and computer vision. This course shows a wide range of multidisciplinary applications in both overlapping fields, from appearance modelling to vision in bad weather, and reviews measurement techniques.

Computer graphics and computer vision deal with acquiring, interpreting, and presenting the rich virtual world around us. These are exciting multidisciplinary fields of research with a wide spectrum of applications that affect our daily lives. However, most current computer-generated imagery represents scenes with clear atmospheres, neglecting light scattering effects. Analogously, most computer-vision systems are not successful when deployed in uncontrolled outdoor environments.

This course addresses the challenges presented by light scattering in computer graphics and computer vision. Both fields have seen great advances over the past few years, but most of the existing algorithms still assume that light emitted by a source or reflected off a surface reaches the sensor unaltered. From a computer graphics perspective, this is due mainly to the complex interactions that occur and the high computational costs of simulating them. In computer vision, scattering has traditionally been considered as noise that one should ideally get rid of.

Scattering effects are one fundamental hurdle that must be overcome to significantly extend and enhance current state-of-the-art graphics and vision techniques and achieve successful impact in a wide range of domains. Given the increasing overlap between computer graphics and computer vision, including hot research fields such as computational photography, this course is useful for practitioners in both communities and everybody who studies the intersection of the two.

**PREREQUISITES**

None

**INTENDED AUDIENCE**

This course is intended for people involved in computer graphics, computer vision, or related fields such as computational photography. It is particularly relevant to SIGGRAPH Asia attendees, as it provides a good understanding of scattering phenomena, state-of-the-art techniques to simulate it and treat it, and a wide range of applications. It is especially useful for attendees who are interested in particular applications such as medical imaging, oceanography, driving simulators, and game production.

**INSTRUCTORS**

Diego Gutierrez
University of Zaragoza

Henrik Wann Jensen
University of California, San Diego

Srinivasa Narasimham
Carnegie Mellon University

Wojciech Jarosz
University of California, San Diego

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**LIGHT INTERACTION WITH HUMAN SKIN: FROM BELIEVABLE IMAGES TO PREDICTABLE MODELS**

⭐ ●

**Wednesday, 10 December**

**13:45–17:30**

**Level: Intermediate**

This course on biophysically based models of light interaction with skin tissues provides details and interdisciplinary concepts often omitted from publications. The emphasis of the course is on scientific issues that need to be addressed in rendering of realistic and predictable images of human skin.

Recent research in image synthesis has focused on rendering of believable and predictable images of biological materials. This course addresses an important topic in this area: predictive simulation of skin appearance. The modelling approaches, algorithms, and data examined during this course can be also applied to rendering other organic materials such as hair and ocular tissues.

The first module of the course provides the biophysical background required not only for development of models of light interaction with organic materials, but also for their evaluation. It begins with a review of optics and “measurement-of-appearance” concepts, followed by a presentation of biological factors involved in the processes of light propagation and
Courses

Wednesday, 10 December – Thursday, 11 December

absorption in skin tissue. A concise review of modelling approaches used in biomedical and related fields, and often cited by computer graphics researchers, completes this module. The second module provides detailed descriptions of computer graphics models of light interaction with human skin, including approaches to practical issues involving their implementation and analysis of their strengths and limitations. Recent developments involving these models, such as extensions, applications, and more accurate or efficient versions, are also examined. The course concludes with a discussion of current and future challenges related to rendering human tissues.

PREREQUISITES
Familiarity with basic optics concepts and radiometric terms. Attendees should have a working knowledge of standard graphics techniques and terminology. Experience with numerical methods is helpful, but not required.

INTENDED AUDIENCE
Students, practitioners, and researchers interested in rendering, biomedical imaging, and natural phenomena.

INSTRUCTORS
Gladimir Baranoski
University of Waterloo

Aravind Krishnaswamy
Adobe Systems Incorporated

THERE CAN BE ONLY ONE: INDEPENDENT ANIMATION FOR THE LONELY
★ ★
Wednesday, 10 December, Tutorial 15:45–17:30
Level: Beginner

Many logistical challenges confront the independent animator. The task of single-handedly producing an animated piece (budget, schedule, creative blocks, copyright issues, sound quality, publicity, distribution, being a jack of all trades, etc.) at first may seem overwhelming and insurmountable, yet this is not the case. With proper planning and adoption of professional strategies for success, animations produced by independent creators can be more creative and higher quality, and their personal experiences can be more rewarding and enjoyable.

In this course, attendees learn pre-production concepts and techniques that will allow them to focus on creative aspects of their projects and avoid time-consuming scheduling mistakes that can cripple production. From concept to design, storyboard to animatic, attendees learn the smartest ways to work and how to save time, money, and heartache as they seek to realize their unique visions. Scheduling, resource management, and copyright issues are explored and discussed in the production segment of the course, to keep the artist on track for project completion while taking care of minute details that could lead to major legal and logistical roadblocks. In the post-production segment, the final edit, output issues, credits, DVD authoring, making press kits, and final submission to animation festivals are addressed, giving attendees a clear, organized plan of creation and production. With more careful organisation, animators can concentrate on the creative aspects of their work and not get bogged down in unforeseen details.

PREREQUISITES
General knowledge of computer graphics and at least beginning-level experience in digital animation and design, either 3D or 2D.

INTENDED AUDIENCE
This course is ideally suited for beginning and intermediate student animators, and interested professionals and (especially) independent animators.

INSTRUCTORS
Kristen Palana
The American University of Rome

Steve Rittler
William Paterson University

INTRODUCTION TO COMPUTER GRAPHICS SHADERS WITH GLMAN
★ ★
Thursday, 11 December 13:45–17:30
Level: Intermediate

An introduction to the programmable shader capabilities of the latest generation of graphics cards. Attendees learn to write graphics programmes using vertex, fragment, and geometry shaders, and use the glman tool to develop the shaders independently from the applications that will use them.

The course covers basic shader concepts, showing how shaders fit into the traditional graphics pipeline and how they communicate with each other and with an application. The GLSL language is introduced, along with the special types and built-in variable names it uses, and how the GLSL API is used to add shaders to an OpenGL application. Examples illustrate how shaders can be used to implement advanced modelling and shading features, and the use of noise, image manipulation techniques, and LOD operations. Specific applications of shaders in scientific visualisation are also presented. A CD containing the glman tool and code for all the examples used in the course will be distributed, and attendees will be able to install glman on their laptops and work with the examples as the course progresses.

After this course, an experienced OpenGL programmer will be able to write shader programmes and integrate them into graphics applications.

PREREQUISITES
A solid knowledge of fixed-function OpenGL programming and a basic understanding of higher-level computer graphics concepts.

INTENDED AUDIENCE
Anyone who wants to understand and use the vertex, fragment, and geometry shaders that are available with the GLSL shading language in the latest versions of OpenGL.

INSTRUCTORS
Steve Cunningham
Brown Cunningham Associates

Mike Bailey
Oregon State University

MESH PARAMETERISATION: THEORY AND PRACTICE
★ ★
Thursday, 11 December 13:45–17:30
Level: Intermediate

Mesh parameterisation is a powerful geometry-processing tool with numerous computer graphics applications, from texture mapping to animation transfer. This course outlines its mathematical foundations, describes recent methods for parameterizing meshes over various domains, discusses emerging tools like global parameterisation and inter-surface

mapping, and demonstrates a variety of parameterisation applications.

For any two surfaces with similar topology, there exists a bijective mapping between them. If one of these surfaces is a triangular mesh, the problem of computing such a mapping is referred to as mesh parameterisation. The surface that the mesh is mapped to is typically called the parameter domain.

Parameterisation was introduced to computer graphics for mapping textures onto surfaces. Over the last decade, it has gradually become a ubiquitous tool for many mesh-processing applications, including detail-mapping, detail-transfer, morphing, mesh-editing, mesh-completion, remeshing, compression, surface-fitting, and shape-analysis. In parallel to the increased interest in applying parameterisation, various methods were developed for different kinds of parameter domains and parameterisation properties.

The goal of this course is to familiarize attendees with the theoretical and practical aspects of mesh parameterisation. It provides the skills needed to implement or improve existing methods, investigate new approaches, and critically evaluate the suitability of the techniques for a particular application.

The course begins with an introduction to the general concept of parameterisation and an overview of its applications. The first half of the course then focuses on planar parameterisations, while the second addresses more recent approaches for alternative domains. The course covers the mathematical background, including intuitive explanations of parameterisation properties like bijectivity, conformality, stretch, and area-preservation. The state of the art is reviewed by explaining the main ideas of several approaches, summarizing their properties, and illustrating them using live demos. The course concludes with a list of open research problems and potential applications that can benefit from parameterisation.

PREREQUISITES
Some prior exposure to mesh representation of geometric models and a working knowledge of vector calculus, elementary linear algebra, and the fundamentals of computer graphics. Some familiarity with differential geometry and graph theory is useful, but not required.

INTENDED AUDIENCE
Graduate students, researchers, and application developers who want to understand and use the concepts and technologies used in mesh parameterisation.

INSTRUCTORS
Kai Hormann
Technische Universität Clausthal
Konrad Polthier
Freie Universität Berlin
Alla Sheffer
The University of British Columbia

REAL-TIME INDIVIDUALIZED VIRTUAL HUMANS
★ ●
Thursday, 11 December
13:45–17:30
Level: Intermediate

The latest techniques for modelling fast, individualized, animatable virtual humans for real-time applications. Because a human is composed of a head and a body, this course analyses how these two parts can be modeled and globally animated. More precisely, it shows how individualized real-time bodies can be automatically generated from scanned data or from interactive measurements and how an automatic skeleton can be created for any body size, animated automatically, controlled in real time, and retargeted according to a motion-sequences database. Other topics include: facial animation from facial motion capture and simulation of interactive, realistic talking virtual humans, including personality models and complete body gestures.

The course also shows how crowds are modeled in real time using dynamic meshes, static meshes, and impostors, and explains techniques for adding variety to crowds, including individual animation, individualized path-planning, and accessories.

Several case studies in cultural heritage, emergency situations, and fashion modeling are presented to illustrate interaction with virtual humans. And the course concludes with a summary of open research topics in the virtual-human field.

PREREQUISITES
Familiarity with the fundamentals of computer graphics and computer animation, geometrical methods, collision detection and response, and real-time techniques is highly recommended but not mandatory.

INTENDED AUDIENCE
Developers of real-time virtual worlds, technical directors, researchers, and game developers who are looking for innovation as well as proven methodologies in simulating real-time virtual humans.

INSTRUCTORS
Nadia Magnenat-Thalman
MIRALab, Université de Genève

daniel Thalmann
VRlab, EPFL

MULTIPERSPECTIVE MODELING, RENDERING, AND IMAGING
★ ●
Thursday, 11 December, Tutorial
15:45–17:30
Level: Intermediate

A perspective image represents the spatial relationships of objects in a scene as they would appear from a single viewpoint. In contrast, a multiperspective image combines what is seen from several viewpoints into a single image. Despite their incongruity of view, effective multiperspective images can preserve spatial coherence and can depict, within a single context, details of a scene that are simultaneously inaccessible from a single view, yet easily interpretable by a viewer. In computer vision, multiperspective images have been used to analyse structure revealed via motion and generate panoramic images with a wide field of view using mirrors.

This tutorial provides a practical guide on topics in multiperspective modelling and rendering methods, and multiperspective imaging systems. It begins with a brief review of multiperspective image techniques frequently employed by artists. Illustrations include the visual paradoxes of Escher, the Cubism of Picasso and Braque, and multi-perspective panoramas in cel-animations. The course characterises existing multiperspective camera models, with an emphasis on their underlying geometry and image properties, then demonstrates how to use these camera models for creating specific multiperspective rendering effects. The course includes demonstrations of several multiperspective imaging systems for extracting 3D geometry for computer vision.
CG PRODUCTION PRINCIPLES: KEEPING YOUR MONEY ON THE SCREEN & OFF THE FLOOR

Thursday, 11 December, Tutorial
13:45–15:30
Level: Intermediate

Are you satisfied with your production relationships, communication, adaptation, and high-quality delivery? Animation-industry veteran Kevin Geiger helps you analyse these questions with his unique organizational insight and signature presentation style. You will never look at your pipeline or your studio the same way again.

How much of your money makes it onto the screen? Got a leaky pipeline? Is your workflow trickling? Does your team approach work like a film, or like a science project? Can you roll with last-minute story changes? What economies of scale do you employ?

The global animation industry is as competitive as ever, with merciless markets, unforgiving audiences, and leaner profit margins. Yet independent and major productions alike seem content to burn through money (and people) as though they have resources to spare. This sort of waste is so pervasive in our industry that it is routinely acknowledged with a winking “you-know-how-production-is” acceptance. This attitude is not only irresponsible, it is also unsustainable. And it is easily addressed through insightful, considerate, and fearless assessment and action.

This course begins with an examination of the human factors and organizational considerations that are the foundation of all production (dy)function. Next, it covers workflow considerations and strategies, establishment (and erosion) of balance, common heuristic assumptions and errors, and the importance of clarity and adaptation within the studio environment. A series of “Golden Rules” for production leads into the characteristics of a balanced pipeline, an overview of a robust non-linear production pipeline, and specific departmental examples. Finally, the course reviews asset management with an eye toward organization, flexibility, and transparency. The presentation concludes with a micro/macro view of the production paradigm, and the synergistic orchestration of these parts into a transcendent whole.

PREREQUISITES
Basic understanding of camera operation, image processing, and machine vision.

INTENDED AUDIENCE
Digital artists, photographers, and computer graphics and computer vision researchers who use or build multiperspective cameras.

INSTRUCTOR
Jingyi Yu
University of Delaware

LEVEL: Intermediate

DISCRETE DIFFERENTIAL GEOMETRY: AN APPLIED INTRODUCTION

Friday, 12 December
08:30–17:30
Level: Advanced

This new and elegant area of mathematics has exciting applications, as this course demonstrates by presenting practical examples in geometry processing (surface fairing, parameterisation, and remeshing) and simulation (of cloth, shells, rods, and fluids).

The behavior of physical systems is typically described by a set of continuous equations using tools such as geometric mechanics and differential geometry to analyze and capture their properties. For purposes of computation, one must derive discrete (in space and time) representations of the underlying equations. Researchers in a variety of areas have discovered that theories, which are discrete from the start and have key geometric properties built into their discrete description, can often more readily yield robust numerical simulations that are true to the underlying continuous systems: they exactly preserve invariants of the continuous systems in the discrete computational realm.

This course introduces the nascent field of discrete differential geometry, laying out fundamental concepts and surveying the exciting array of applications. It begins with a simple-to-follow presentation of discrete curves and discrete curvature. This back-drop introduces the overarching theme structure of preservation, which makes repeated appearances throughout the entire course. As the day proceeds, the course explores the question of which quantities one should measure on a discrete object such as a triangle mesh, and how one should define such measurements.

Following the introduction of the basic technical concepts, the course proceeds to investigate numerous exciting application areas. The lectures introduce and delve deeply into geometric modelling problems (including variational remeshing and parameterisation using discrete exterior calculus) and physical simulation of curves (such as elastic rods and hair), surfaces (such as cloth and thin-shells), and volumes (such as fluids). The emphasis is on understanding how structure preservation leads to simple and highly efficient implementations of important physical simulations.

PREREQUISITES
A working knowledge of vector calculus and elementary linear algebra. Optional prerequisites: some lectures may also assume some familiarity with physical simulation, geometry processing, and triangle and tetrahedral meshes. Recommended but not required: a basic understanding of continuous local differential geometry and classical mechanics.

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

INSTRUCTORS
Mathieu Desbrun
California Institute of Technology
Peter Schröder
California Institute of Technology
Max Wardetzky
Georg-August-Universität Göttingen

Courses

PARALLEL COMPUTING FOR GRAPHICS: BEYOND PROGRAMMABLE SHADING ★ ●
Friday, 12 December
08:30–17:30
Level: Beginner

This course provides an introduction to parallel-programming architectures and environments for interactive graphics and demonstrates how to combine traditional rendering API with advanced parallel computation.

There are strong indications that the future of interactive graphics involves a more flexible programming model than today’s OpenGL/Direct3D pipelines. That means that graphics developers will need a basic understanding of how to combine emerging parallel-programming techniques with the traditional interactive rendering pipeline. The first half of the course introduces several parallel graphics architectures, programming environments, and the new types of graphics algorithms that will be possible. The second half presents case studies of how game developers, researchers, and graphics hardware vendors combine traditional rendering API techniques with advanced parallel computation. Each case study includes a live demo and discusses the mix of parallel-programming constructs used, details of the graphics algorithm, and how the rendering pipeline and computation interact to achieve the technical goals.

PREREQUISITES
Knowledge of general purpose programming languages.

INTENDED AUDIENCE
Developers interested in general purpose computing on the GPU.

INSTRUCTORS
Jason Yang
Advanced Micro Devices, Inc.

Justin Hensley
Advanced Micro Devices, Inc.

Tim Foley
Intel Corporation

Mark Harris
NVIDIA Corporation

Anselmo Lastra
University of North Carolina at Chapel Hill

Anjul Patney
University of California, Davis

Pedro V. Sander
Hong Kong University of Science and Technology

Jeremy Shopf
Advanced Micro Devices, Inc.

Kun Zhou
Zhejiang University

SEEING IN 3D ★ ●
Friday, 12 December
08:30–17:30
Level: Beginner

Most people, even technical draftsmen, designers and computer graphics programmers, find it very difficult to visualise 3D shapes well enough to reason about them. This course demonstrates the problem and takes attendees through a series of exercises that help them acquire this important practical skill.

“Stand a cube on its corner. What is the shape of a horizontal cross-section taken at half the height of this object?” About four percent of human beings can reason about 3D space well enough to answer this question easily and with confidence. Most of us enter a state of panic when confronted by 3D problems. Yet it is possible to train yourself to think and visualise in 3D. This course helps attendees start thinking in 3D. Once they have the basic principles, they can develop the skill independently.

PREREQUISITES
Familiarity with some basic geometric ideas (for example, two planes meet in a straight line). Also helpful: awareness of how to find distances with Pythagoras’ theorem, but this is used for only a few exercises, and the course can be understood without mathematics.

INTENDED AUDIENCE
Graphic artists, engineers, designers, computer graphics programmers, and students interested in graphics, drawing, or sculpture.

INSTRUCTORS
Geoff Wyvill
University of Otago

Bob Parslow
Independent Consultant

ADVANCED ILLUMINATION TECHNIQUES FOR GPU-BASED VOLUME RAY CASTING ★ ●
Saturday, 13 December
08:30–12:15
Level: Intermediate

In-depth instruction on advanced illumination techniques for volume ray casting implemented on the graphics processing unit (GPU). This course covers fast implementations of local and global illumination techniques for volume data and implicit surfaces, including ambient occlusion, deep shadow maps, and scattering effects.

Volume ray-casting techniques are important for both visual arts and visualisation. They support efficient generation of visual effects and visualisation of scientific data obtained by tomography or numerical simulation. Due to their flexibility, experts agree that GPU-based ray casting is the state-of-the-art technique for interactive volume rendering. It will most likely replace existing slice-based techniques in the near future. Volume rendering techniques are also effective for direct rendering of implicit surfaces used for soft-body animation and constructive solid geometry.

The course, which begins with a detailed introduction to the concepts behind GPU-based ray casting, focuses on advanced illumination techniques that approximate physically based light transport more convincingly. Such techniques include interactive implementation of soft and hard shadows, ambient occlusion, and simple Monte-Carlo based approaches to global illumination, including translucency and scattering.

With these techniques, users can interactively create convincing images from volumetric data whose visual quality goes far beyond traditional approaches. Using volume rendering techniques, artists who create medical visualisation for science magazines may now work on tomographic scans directly, without creating polygonal models of anatomical structures.

PREREQUISITES
A working knowledge of computer graphics and basic programming skills, familiarity with graphics hardware and shading languages, and basic knowledge of volume data and interactive volume-rendering techniques.

http://www.siggraph.org/asia2008

SIGGRAPH Asia 2008 Advance Programme
Courses

INTENDED AUDIENCE
The steadily growing number of developers who create specialized implementations of volume-rendering techniques on state-of-the-art graphics hardware.

INSTRUCTORS
Christof Rezk-Salama
Universität Siegen

Markus Hadwiger
VRVis Research Center for Virtual Reality and Visualization

Timo Ropinski
Westfälische Wilhelms-Universität Münster

Patric Ljung
Siemens Corporate Research

MODERN OPENGL: ITS DESIGN AND EVOLUTION
★ ●
Saturday, 13 December
13:45–17:30
Level: Intermediate

A long-time implementer of OpenGL and the system's original architect explain OpenGL's design and evolution. OpenGL's state machine is now a complex data flow with multiple programmable stages. In this course, OpenGL practitioners can expect candid design explanations, advice for programming modern GPUs, and insight into OpenGL's future.

OpenGL was conceived in 1991 to provide an industry standard for programming the hardware graphics pipeline. The original design has evolved considerably over the last 17 years. Whereas capabilities mandated by OpenGL such as texture mapping and a stencil buffer were present only on the world's most expensive graphics hardware in 1991, now these features are completely pervasive in PCs and are even available in several hand-held devices. Over that time, OpenGL's original fixed-function state machine has evolved into a complex data flow including several application-programmable stages. And the performance of OpenGL has increased from 100x to over 1,000x in many important raw graphics operations.

This course explains how the modern (post-2006) graphics hardware pipeline is exposed through OpenGL. Kurt Akeley presents his personal retrospective on OpenGL's development. Attendees learn nine ways to write better OpenGL programs and how modern OpenGL implementations operate. In conclusion, the course assesses OpenGL's future evolution.

Whether you program with OpenGL or program with another API such as Direct3D, this course gives you new insights into graphics hardware architecture, programmable shading, and how to take maximum advantage of modern GPUs.

PREREQUISITES
Familiarity with the OpenGL graphics system. Familiarity with other graphics APIs such as Direct3D is helpful. The course assumes that attendees are familiar with concepts such as rasterization, shading, texturing, and vertex transformation.

INTENDED AUDIENCE
Graphics practitioners who want to better understand the modern 3D graphics hardware pipeline and its evolution as expressed through OpenGL. OpenGL programmers who want to learn how to update their programming practices to improve the performance and cross-platform portability of their OpenGL applications.

INSTRUCTORS
Mark Kilgard
NVIDIA Corporation

Kurt Akeley
Microsoft Research Silicon Valley

INTERACTIVE INTRODUCTION TO X3D GRAPHICS
★ ●
Saturday, 13 December
13:15–17:30
Level: Beginner

Extensible 3D (X3D) graphics is the open standard for 3D real-time communication on the web. X3D defines scene files that integrate network-enabled 3D graphics and multimedia. X3D applications are real-time, interactive, animated systems that can run stand-alone or in networked virtual environments. This tutorial focuses on the primary functionality of X3D including scene authoring, creation of geometry, web capabilities, designing animation chains, and user interaction.

Specific topics include animation design using interpolators and sequencers. The tutorial briefly examines embedded scripting, prototypes for extensibility, and various visualisation examples. Attendees learn hands-on how to build an X3D world, and they have access to the latest X3D Showcase DVD, which contains a wide variety of free and commercial viewers, authoring tools, and example content.

PREREQUISITES
Understanding 3D scene graphs and 3D modelling is helpful but not required. X3D can be learned without prior programming experience.

INTENDED AUDIENCE
Beginning modellers, who will learn how to create simple 3D scene graphs with animation and user interactivity; experienced programmers, who will learn how their current knowledge can be expressed using a web standard for broader interoperability; and educators, who will learn how X3D can be used for introductory graphics courses.

INSTRUCTOR
Don Brutzman
Naval Postgraduate School

DEVELOPING AUGMENTED REALITY APPLICATIONS
★ ●
Saturday, 13 December
08:30–12:15
Level: Beginner

In this course, attendees learn how to use open source software to build their own augmented reality (AR) applications.

As computers become more and more invisible, AR (overlaying virtual images on the real world) is becoming an increasingly important application area for computer graphics and user interface design. This detailed introduction to AR interface design and research includes reviews of important topics such as tracking and registration, interaction techniques, design principles, and usability evaluation, as well as key areas for current and future AR research. Case studies are presented in the application areas of gaming, entertainment, medicine, and engineering. Part of the course also involves hands-on demonstrations where attendees will be able to experience the technology for themselves.

Significant portions of the course are devoted to reviewing the ARToolKit and os-gART open-source software tools that can be used to start building AR applications, as well as other supporting software tools. After this course, attendees will understand the fundamentals of AR interface design,
Courses

the tools they can use to build AR applications, and how to evaluate them once they are built.

PREREQUISITES
Some programming experience is useful but not necessary. Also useful but not required: some experience with C/C++ programming and the OpenGL API.

INTENDED AUDIENCE
Academic and industrial researchers, and anyone interested in developing AR applications.

INSTRUCTORS
Mark Billinghurst
Human Interface Technology Laboratory
New Zealand

Raphaël Grasset
Human Interface Technology Laboratory
New Zealand
The SIGGRAPH Asia 2008 Technical Papers programme is a premier international forum for disseminating provocative and important new work in computer graphics and interactive techniques. Leading international experts from Asia and beyond present peer-reviewed research in rendering, modelling, animation, human-computer interaction, computer-aided design, virtual reality, and visualization.

This year also features SIGGRAPH Asia’s first back-to-back Technical Papers Fast Forward Session. Get a preview of the latest research in computer graphics and interactive techniques and select the Technical Papers that you need to attend later in the week.

**TECHNICAL PAPERS FAST FORWARD SESSION**

**SHAPE MODELLING**

**Session Chair**

**Single Image Tree Modelling**
A simple and rapid method to generate a realistic 3D tree model from a single image.

**Sketch-Based Tree Modelling Using Markov Random Field**
A new system for converting a free-hand tree sketch into a full 3D model that is complex and realistic-looking. The problem is formulated as Markov random field.

**Space-Time Surface Reconstruction Using Incompressible Flow**
This work deals with the problem of re-constructing watertight objects deforming across time. The process takes advantage of space-time coherence and adopts a global approach considering all frames simultaneously.

**Non-Homogeneous Resizing of Complex Models**
Resizing of 3D models can be very useful when creating new models or placing models inside different scenes. However, straightforward nonuniform scaling can destroy features and lead to serious visual artifacts. This paper introduces a method that resizes 3D models in an intuitive way, protecting model features and structure.

**Mesh Ensemble Motion Graphs: Data-Driven Mesh Animation With Constraints**
This approach to data-driven animation of high-dimensional mesh ensembles, such as tree-structured botanical models, proposes a randomized space-time optimization algorithm for precomputing smooth asynchronous transitions that also avoid introducing non-physical self-collisions.

**Thursday, 11 December**

CHARACTER ANIMATION I
★ ●
Thursday, 11 December
13:45–15:30

SESSION CHAIR
Subodh Kumar

Animating Responsive Characters With Dynamic Constraints in Near-Unactuated Coordinates
An approach to animating physically responsive virtual characters by combining kinematic pose control with dynamic constraints in the muscle-actuation space.

Yuting Ye
C. Karen Liu
Georgia Institute of Technology

Synthesis of Constrained Walking Skills
A flexible framework for locomotion that enables physically simulated characters to navigate across terrains with gaps and other stepping constraints.

Stelian Coros
Kang Kang Yin
Philippe Beaudoin
Michiel van de Panne
The University of British Columbia

Interaction Patches for Multi-Character Animation
A method to generate large-scale character animation, such as a character fighting with many enemies, and a crowd passing luggage one after another in a warehouse.

Hubert P.H. Shum
Taku Komura
University of Edinburgh
Masashi Shiraiishi
Waseda University
Shuntaro Yamazaki
National Institute of Advanced Industrial Science and Technology

Motion Overview of Human Actions
A method for generating overview videos based on the analysis of motion capture data.

Jackie Assa
Daniel Cohen-Or
Tel Aviv University
I-Cheng Yeh
Tong-Yee Lee
National Cheng Kung University

FUN WITH SINGLE IMAGES
★ ●
Thursday, 11 December
15:45–18:00

SESSION CHAIR
Kang Sing Bing

Deep Photo: Model-Based Photograph Enhancement and Viewing
A novel method for browsing, enhancing, and manipulating outdoor photographs by combining them with existing geo-referenced digital terrain and urban models.

Johannes Kopf
Universität Konstanz

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A flexible framework for locomotion that enables physically simulated characters to navigate across terrains with gaps and other stepping constraints.

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I-Cheng Yeh
Tong-Yee Lee
National Cheng Kung University

Optimised Scale-and-Stretch for Image Resizing
An image-resizing method that computes an optimal scaling transformation for each local region, such that the aspect ratios of the automatically detected prominent features are preserved.

Yu-Shuen Wang
National Cheng Kung University

Deep Photo: Model-Based Photograph Enhancement and Viewing
A novel method for browsing, enhancing, and manipulating outdoor photographs by combining them with existing geo-referenced digital terrain and urban models.

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Daniel Cohen-Or
Tel Aviv University
I-Cheng Yeh
Tong-Yee Lee
National Cheng Kung University
CHARACTER ANIMATION II
Friday, 12 December
08:00–10:15

SESSION CHAIR
Doug James

Facial Performance Synthesis Using Deformation-Driven Polynomial Displacement Maps
A method for acquiring, modelling, compressing, and synthesizing realistic detailed facial deformations using polynomial displacement maps driven by coarse motion capture markers.

Wan-Chun Ma
University of Southern California, National Taiwan University
Andrew Jones
Julian Chiang
Tim Hawkins
Sune Frederiksen
Pieter Peers
University of Southern California
Marko Vukovic
Sony Pictures Imageworks
Ming Ouyoung
National Taiwan University
Paul Debevec
USC Institute for Creative Technologies

Reusable Skinning Templates Using Cage-Based Deformations
A skinning template abstraction that makes it easy to design and transfer skin deformation styles.

Tao Ju
Washington University in St. Louis
Qian-Yi Zhou
University of Southern California
Michiel van de Panne
The University of British Columbia
Daniel Cohen-Or
Tel Aviv University
Ulrich Neumann
University of Southern California
 accelerometer-based User Interfaces for the Control of a Physically Simulated Character
User study of three Wiimote interfaces for controlling a physically simulated character.

LIGHTING, SHADING, AND GPUs
Friday, 12 December
08:00–10:15

SESSION CHAIR
Nelson Max

Real-Time KD-Tree Construction on Graphics Hardware
The first real-time algorithm for constructing kd-trees on GPUs and its potential in GPU ray tracing, photon mapping, and point-cloud modelling.

Kun Zhou
Zhejiang University
Qiming Hou
Tsinghua University

Imperfect Shadow Maps for Efficient Computation of Indirect Illumination
A method for interactive computation of indirect illumination in large and fully dynamic scenes. It is based on approximate visibility encoded in imperfect shadow maps.

Tobias Ritschel
Thorsten Grosch
Max Planck Institut für Informatik
Min H. Kim
University College London
Hans-Peter Seidel
Max Planck Institut für Informatik

Progressive Photon Mapping
A new formulation of photon mapping for computing global illumination with progressive refinement.

Toshiya Hachisuka
University of California, San Diego
Shinji Ogaki
The University of Nottingham
Henrik Wann Jensen
University of California, San Diego

IMAGE-BASED CAPTURE
Friday, 12 December
10:30–12:15

SESSION CHAIR
Chi-Keung Tang

Shield Fields: Modelling and Capturing 3D Occluders
Decoupling 3D occluders from 4D illumination using shield fields, then analysing occluder reconstruction from cast shadows, leading to a single-shot light-field camera for visual hull reconstruction.

Douglas Lanman
Mitsubishi Electric Research Laboratory, Brown University
Ramesh Raskar
MIT Media Lab, Mitsubishi Electric Research Laboratory
Amit Agrawal
Mitsubishi Electric Research Laboratory
Gabriel Taubin
Brown University

Time-Resolved 3D Capture of Non-Stationary Gas Flows
A new method for capturing dynamic gas flows in 3D.

Bradley Atcheson
Ivo Ihrke
Wolfgang Heidrich
The University of British Columbia

Extracting Depth and Matte Using a Color-Filtered Aperture
This method automatically extracts a scene-depth map and the alpha matte of a foreground object by capturing a scene through RGB color filters placed in the camera lens aperture.

Yosuke Bando
Toshiba Corporation, The University of Tokyo
Bing-Yu Chen
National Taiwan University
Tomoyuki Nishita
The University of Tokyo

TEXTURE
Friday, 12 December
13:45–15:30 pm

SESSION CHAIR
Johannes Kopf

Random-Access Rendering of General Vector Graphics
An efficient representation for random-access anti-aliased vector graphics on the GPU, consisting of a lattice of cell-specialised variable-length descriptions.

Diego Nehab
Hugues Hoppe
Microsoft Research
A Layered, Heterogeneous Reflectance Model for Acquiring and Rendering Human Skin

A layered, heterogeneous, spectral reflectance model for acquiring and rendering the appearance of human skin. The model measures appearance via a novel acquisition method that uses multi-spectral photographs.

Craig Donner
Columbia University

Tim Weyrich
University College London

Eugene d’Eon
NVIDIA Corporation

Ravi Ramamoorthi
Columbia University

Szymon Rusinkiewicz
Princeton University

Phong Tessellation
The Phong Tessellation is a geometric version of the Phong normal interpolation to improve the visual continuity of meshes with a local curved displacement, adapted to current and next-generation GPUs.

Marc Alexa
Technische Universität Berlin

Subdivision Shading
Rendering subdivision surfaces using normals generated by subdivision.

Marc Alexa
Tamy Boubekeur
Technische Universität Berlin

Real-Time Reyes-Style Adaptive Surface Subdivision
An efficient and real-time Reyes-like surface subdivision (split/dice) using modern GPGPU techniques that subdivides complex models to subpixel accuracy in a few milliseconds.

Anjul Patney, John Owens
University of California, Davis

Randomised Cuts for 3D Mesh Analysis
This paper investigates a new shape analysis method based on randomised cuts of 3D surface meshes.

Aleksey Golovinskiy
Thomas Funkhouser
Princeton University

Deduction of Interpolating Subdivision Schemes From Approximating Subdivision Schemes
A method for directly deducing new interpolating subdivision schemes from the corresponding approximations. The purpose is to solve some limitations in the exiting interpolating subdivision.

Shujin Lin
Xiaonan Luo
Fang You
Zheng Li
Sun Yat-sen University

Superimposing Dynamic Range
A cost-efficient way of extending contrast, perceived tonal resolution, and color space of static hardcopy images, beyond the capabilities of hardcopies or low-dynamic-range displays alone.

Oliver Blimer
Bauhaus Universität Weimar

Daisuke Iwai
Osaka University
VirtualStudio2Go: Digital Video Composition for Real Environments
Synchronised film cameras, video projectors, and high-speed LED lighting, together with radiometric image correction, enable professional digital video composition effects in real environments without the constraints of virtual studios.

Anselm Grundhoefer
Oliver Bimber
Bauhaus Universität Weimar

Intrinsic Colourisation
An example-based colourisation technique robust to illumination differences between grayscale target and colour-reference images.

Xiaopei Liu
Liang Wan
Yingge Qu
Tien-Tsin Wong
The Chinese University of Hong Kong

Stephen Lin
Microsoft Research Asia

Chi-Sing Leung
City University of Hong Kong

Pheng-Ann Heng
The Chinese University of Hong Kong

Fast Image/Video Upsampling
A simple yet effective upsampling method for automatically enhancing image/video resolution, while naturally preserving the structural information and temporal coherence.

Qi Shan
Zhaorong Li
Jiaya Jia
The Chinese University of Hong Kong

Chi-Keung Tang
Hong Kong University of Science & Technology

Non-Photorealistic Rendering

Continuous Model Synthesis
A novel method for procedurally modelling large complex shapes. The approach is general-purpose and accepts as input any 3D polyhedral model provided by a user.

Paul Merrell
Dinesh Manocha
University of North Carolina at Chapel Hill

Interactive 3D Architectural Modelling From Unordered Photo Collections
An interactive image-based modelling system for architectural scenes that leverages recent advances in automatic computer vision techniques and sketch-based 3D modelling and handles large photo collections.

Sudipta Sinha
University of North Carolina at Chapel Hill

Drew Steedly
Microsoft Live Labs

Richard Szeliski
Microsoft Research

Maneesh Agrawala
University of California, Berkeley

Marc Pollefeys
ETH Zürich, University of North Carolina at Chapel Hill

Interactive Example-Based Urban Layout Synthesis
An interactive system for synthesising urban layouts by example. New urban layouts are inferred from the road network, parcel data, and aerial images of given cities.

Daniel Aliaga
Carlos Vanegas
Bedrich Benes
Purdue University
Image-Based Façade Modelling
A semi-automatic image-based approach to building façade modelling from automatically recovered cameras and 3D points of a sequence of images.

Jianxiong Xiao
Tian Fang
Hong Kong University of Science & Technology

Ping Tan
National University of Singapore

Peng Zhao
Hong Kong University of Science & Technology

Eyal Ofek
Microsoft Corporation

Long Quan
Hong Kong University of Science & Technology

PHYSICALLY BASED ANIMATION
★ ●
Saturday, 13 December
15:45–18:00

SESSION CHAIR
Hyeong-Seok Ko

Magnets in Motion
A method for magnetic interaction in rigid-body simulation, allowing interactive simulation of dozens of magnets. The approach is physically sound and has excellent accuracy and preservation properties.

Bernhard Thomaszewski
Andreas Gumann
Simon Pabst
Wolfgang Strasser
Universität Tübingen

Real-Time Control of Physically Based Simulations Using Gentle Forces
Real-time control with gentle forces cooperates with natural dynamics to generate simulations that are fast, compliant, and directable.

Jernej Barbic
Jovan Popović
Massachusetts Institute of Technology

Staggered Projections for Frictional Contact in Multibody Systems
A discrete, velocity-level formulation of frictional-contact dynamics that enables a novel and accurate algorithm for frictional-contact resolution based on a simple staggered sequence of projections.

Danny Kaufman
Shinjiro Sueda
The University of British Columbia

Doug James
Cornell University

Dinesh Pai
The University of British Columbia

Optimising Cubature for Efficient Integration of Subspace Deformations
Cubature optimisation enables fast evaluation of subspace internal forces associated with subspace deformations of models with complex geometry, nonlinear deformations, and nonlinear hyperelastic materials.

Steven An
Theodore Kim
Doug James
Cornell University

Fast Animation of Turbulence Using Energy Transport and Procedural Synthesis
A novel technique for animation of turbulent fluids by coupling a procedural turbulence model with a numerical fluid solver to introduce subgrid-scale flow detail.

Rahul Narain
Jason Sewall
University of North Carolina at Chapel Hill

Mark Carlson
DreamWorks Animation

Ming Lin
University of North Carolina at Chapel Hill
Envisioned as an international gathering of industry professionals and academics, the Educators Programme presents perspectives that appeal to a wide spectrum of interests. The goal is to share educational strategies adopted in both industry and academia to make the learning process more satisfying, productive, and meaningful.

**METHODOLOGIES IN LEARNING**

**Thursday, 11 December**

**08:30–10:15**

**Educators Papers**

**SESSION CHAIR:**

Mark Chavez

**Computer Graphics in Context:**

An Approach to a First Course in Computer Graphics

This paper discusses the concept of teaching a first course in computer graphics that includes a context - a field outside computer graphics in which graphics is used - in order to engage students and broaden their understanding of the graphics principles. The paper presents a specific example, a course in computer science, where creating an engagement with a wider topic is known to improve student learning.

Steve Cunningham
Brown Cunningham Associates

**Using Augmented Reality to Promote Understanding of Materials Science to School Children**

Using tables of data to understand and compare their properties is a rather boring and unintuitive way to learn about materials. Children learn much more quickly and intuitively if they can touch the materials they are learning about and link them directly to their properties and applications. But such an approach can be very demanding on teachers’ knowledge and attention, especially in large classes.

The challenge is to engage pupils by exploiting information and communication technology to aid the learning process. If this approach can build on their interest in animations and exciting graphics, developed through their exposure to television and computer games, then so much the better. Kids rarely read the instructions when playing computer games, since they adopt intuitive protocols.

Augmented reality (AR) is a relatively mature technology, but so far it remains largely undiscovered by schools as a means of enhancing traditional lesson delivery. The advantage of AR is its ability to overlay information on real physical objects as viewed on a LCD projector or interactive white board. This paper describes a set of educational AR software for helping children to familiarise themselves with simple physics, chemistry, and materials principles.

AR technology brings photographic and computer-generated images into real environments, facilitating real-time 3D interactions connected to physically available objects. The tools developed in this project comprise four major kinds of applications, each designed to help pupils learn about materials and their applications. The linkages between the hands-on materials and their properties and applications are explored through a series of puzzles, games, and tasks, with the AR providing intuitive guidance. For example, pupils can try to identify the materials required to build a jet engine or play a “top trumps” game with the computer to choose attributes for their materials that could outperform the materials chosen by the computer. The AR system also acts as a virtual microscope to reveal the microstructure of a given material as it is placed under the web-cam. For younger pupils, the school can use a simpler AR tool to learn about the categorisation of materials (metal, ceramic, polymer, and natural). The AR recognition software rewards correct allocations and helps pupils to identify mistakes.

This paper outlines development and deployment of AR and discusses evaluations that will be carried out with teachers and pupils during exhibitions at the Farnborough Air Show, the Manchester Science Festival, and schools visits. The goal is to provide a valuable starting point for other AR developments in educational settings.

Kevin Tan
Emma Lewis
University of Manchester

Nick Avis
Cardiff University

Philip Withers
University of Manchester

**Simulating Educational Physical Experiments in Augmented Reality**

This paper presents PhysicsPlayground, an augmented reality application that utilizes a recent physics engine developed for the PC gaming market to simulate physical experiments in mechanics in real time. Students are able to actively build their own experiments and study them in a three-dimensional virtual world. Several tools are provided to analyze forces, mass, paths, and other properties of objects before, during, and after experiments. Innovative teaching content exploits the strengths of this immersive virtual environment. PhysicsPlayground is as an example...
of how current technologies can be combined to deliver new experiences in physics education.

Hannes Kaufmann Bernd Meyer Technische Universität Wien

EDUCATORS PROGRAMME
RAMP-IN AND KEYNOTE ADDRESS

★ ●
Thursday, 11 December 13:45–15:30
Educators Paper

Ramp-In: Welcome and Overview of Programme by Programme Chair Mark Chavez

The New Perspective of Consilience of the Arts and Technology in the Era of Ubiquitous Computing

EDUCATORS KEYNOTE ADDRESS
Ubiquitous Arts & Technology (U-AT) Consilience Education is a new term coined by the Korea National University of Arts to refer to consilience of ubiquitous computer technology and diverse arts genres in a narrow sense, and consilience of the arts, humanities, and technology in a broader sense. In this sense, consilience refers to a non-reductionist unity of knowledge, unlike the reductionist consilience in the humanist biology of Edmund Wilson.

The term, coined by William Whewell in the early 19th century, is a revival of the Latin word consalier, which means “varied branches uniting and jumping together to form a unified trunk.” According to the science of complex systems, the process of mixing different elements, and their interactions, are critical requirements for creative experience and knowledge creation.

The key objective of U-AT Consilience Education is to establish a creative education system to produce quality content in multi-source-multi-use mode by institutionalizing the cooperative ties between industry and the university for joint research projects, creative endeavors, and education. The overall purpose is to promote continuous and systematic communications and consilience of six artistic genres: music, drama, film-TV-multimedia, visual arts, dance, and Korean traditional arts.

Park Se-Hyung Korea National University of Arts

METHODOLOGIES IN LEARNING

★ ●
Thursday, 11 December 15:45–17:30
Educators Papers

SESSION CHAIR:
Martin Constable

Shift to The Third Space - isAT 2008
The arts and technology are no longer strangers. They are forging a closer partnership, as the arts reveal what could previously exist only in our imaginations by utilizing ubiquitous technology, and technology, in turn, leaps over the modern era by adding a wing of artistic sensibility to science.

In light of this shift, isAT 2007 (International Symposium for Arts and Technology 2007) was held last year to explore the “Lightning Effects” from the encounter between the arts and technology. Under the theme of Shift to the Third Space, the upcoming event, isAT 2008, will seek the meaning of the union of the arts and technology and explore how ubiquitous computing technology shifts our lives into other dimensions.

Shim Kwang-Hyun Korea National University of Arts

The Animation Solution Kit
The main benefit of independent creation is not cost reduction but quality. In the process of indie-creation, concept art can be retained until final step because it’s mainly created by a small, efficient team. By expanding the traditional concept of “animation,” DMMG Lab makes a “prototype model” for animation based on NPR and, by building a library of models, materials, motion, and effect sources, facilitates a “stand-alone on network,” which enables one person to manage the entire animation process.

Lee Jungmin Korea National University of Arts

Making Intelligent Sounds
An intelligent sound is a sound that can think. It can create, modify, evolve, and even kill itself according to its environment. This paper shows two approaches to this concept. One is creative and experimental (the author’s compositions), and the other is practical and educational (the Intelligent Sound Lab at The Korean National University of Arts).

The Intelligent Sound Lab develops basic technologies and solutions for synthesis of realistic sound effects that can be automatically synthesized according to the recorded or analyzed meta-data of various media content. The main objective of this lab is to develop and build an “intelligent sound library” of sound-effect algorithms that can create and vary themselves according to their content.

Chang, Jaeho Korea National University of Arts

GAME EDUCATION

★ ●
Friday, 12 December 08:30–10:15
Educators Papers

SESSION CHAIR:
Gao Wei Hua

Creating a Multi-Disciplinary Gaming Curriculum: Avoiding Mistakes, Missteps, and Growing Pains
While the volume of game-development curricula has grown dramatically over the past five years, there is still relatively little information on the proliferation of these programmes. At Drexel University, game development has grown from a few unrelated, area-specific courses to a truly multi-disciplinary, multi-course sequence that unifies the foundation skills of several departments and colleges across the university. Yet there have been numerous challenges and changes during the four-year evolution of this sequence. This paper documents the growth of the programme, the problems it encountered, and the solutions developed, in the hope that it can serve as a road map for other institutions.

At Drexel, game development does not “live” in one department, so it mirrors the true nature of game development in commercial settings. Game development is offered in a coordinated, cross-listed series of courses in both the computer science (CS) and digital media (DiGM) majors, and production courses are open to other majors as well. Computer science courses teach foundation software-development skills and offer software design courses for prototyping game concepts. Drexel’s digital media major is one of the oldest such programmes in the United States. It instructs students on the foundation skills of design, art, programming, modelling, animation, audio and video production, and the use of

http://www.siggraph.org/asia2008 SIGGRAPH Asia 2008 Advance Programme Educators Programme 34
industry tools such as Maya and 3ds Max. The gaming courses and projects bring these two majors together, with the additional participation of students and faculty from other majors including music, music industry, screenwriting and playwriting, engineering, and business.

Many problems were encountered during the programme’s growth from an original two-course sequence to the current nine-course offering including: cultural and communication differences between the different majors; scheduling differences across programmes, departments, and colleges; teaching and staffing issues; course sequencing issues; introduction of soft-skill techniques; project management issues; student and staff turnover; rapidly changing technology platforms; lack of adequate texts; software and hardware access issues; and even educating administrators and parents as to what game development entails.

The gaming sequence is designed to reflect the nature of the industry and industry demands and practices. For example, the programme makes heavy use of the iterative development cycle and SCRUM methodology. However, introduction of these techniques provides unique challenges in classroom settings, where students have always been able to “get by” with less-formal structures, or where grades are based on a final submission.

The cross-discipline nature of the course offerings presents logistical challenges for reaching and informing interested students and researchers, and has led to formation of the Drexel RePlay Lab web site.

The 2007-2008 academic year was the first in which the complete complement of courses was fully offered. Despite this, the student work produced from even an abridged offering has been very impressive.

Paul Diefenbach
Drexel University

Sharing the Magic Circle With Spatially Inclusive Games
A discussion of innovative (capstone) projection environments at an IT and electrical engineering school. The overarching brief was to develop both more expansive and immersive viewing and playing environments. Game courses were used as a springboard to extend the students’ creative and critical design thinking in relation to wider interaction-design issues. Imaginative combinations of game engines and peripherals were also used as initial prompters to encourage students to go beyond current game-theory definitions, explore how to increase the player’s sense of embodiment, and transmit the player’s gameplay experience to a wider audience. The resulting prototypes are being incorporated into future versions of CAVE UT to help educators develop more engaging and immersive interactive environments. Hopefully, the next version of CAVE UT will also allow players and audiences to share the so-called “magic circle.”

Erik Champion
The University of New South Wales

PublicVR

Gaming: Back to the Basics
By recreating basic games, this presentation returns to the basics of computer games and experiments with game play, game rules, and players’ psychology. It surveys 2D and 3D games designed as experimental prototypes of “treasure hunting,” “plateau,” and generic “Space Invaders” and “Pac Man” games, and it shows how player experience can be affected by slight changes in game mechanics.

The exploration of game play takes place inside 2D and 3D versions of basic games created by students and professionals during workshops with limited-time assignments. Creators of these games reshape behaviours and relationships governing levels, modes, rules, choices, classes of objects, characters, and interactive elements. They experiment with game play and rules, following the psychology of the players and demonstrating the need to be not too simple and not too complex.

Topics covered in this presentation include how small variations of the elements of game design can affect the game-playing experience, how the architecture of a game can repeat from one game to the other and in different times and contexts, how the player is placed in the center of the gaming experience, and how choices are presented to the player.

The presentation also shows how to create an interactive interface that allows real-time testing of dynamic transformations of game mechanics and rules of play. The audience uses Wiimotes to participate in demos that focus on side-by-side evaluation of basic 2D games and their recreation as 3D games. It also surveys examples of authoring tools, interactive animations, and behavioural engines available for education (Torque, Virtools, XNA).

Jean-Marc Gauthier
Tisch School of the Arts Asia, New York University

The Mindspace of Learning
Friday, 12 December
10:30–12:15
Educators Papers

Session Chair:
Ayumi Miyai

Practice Project Management in Web Site Design: An Experiential Learning Simulation
The current literature suggests that experiential learning is a necessary component of formal instruction in higher education. But research on experiential learning in web site design development and management is minimal. The purpose of this project is to detail research on how to blend experiential learning principles with project management into an actual case of web site design practice for the new age of electronic learning.

Art and design faculties are no strangers to experiential learning. One cannot learn the complexities of the design discipline without extensive design studio projects. Where experiential learning is well integrated, students demonstrate a greater understanding of the complexity of real-world problems. By combining theory with practice, this project helps the academic community understand the relationships among education, work, and technology. It also provides rich dialogues about students’ experiential learning, which helps them build a foundation for professional life in the real world. In this approach, the “process” is as important as the “product.” This study hopes to stimulate further work in this area.

Mei-Fen Chen
Robert Morris College

Guitar Man
This paper proposes a game system that presents a cooperative musical performance system using guitar and bass guitar. Because the bass guitar does not necessarily support fast playing, it is suited to the subject of this study. However, it is necessary to accelerate the speed of a pitch-detection algorithm in order to extend it to a cooperative musical performance.

http://www.siggraph.org/asia2008
SIGGRAPHAsia2008 Advance Programme
Educators Programme 35
system that includes other non-string instruments. A constant time interval should be maintained due to the fact that it is difficult to apply a pitch-detection process for specific tones when the recognition time is reduced.

This study considers how new musical possibilities can be achieved through online networks by overcoming the stereotypes in off-line musical activities, such as music-instrument lessons or traditional co-operative performances. It is based on the assumption that the future computer game industry will not be developed as a simple virtual reality but an actual systems like the cooperative musical performance system proposed in this paper.

Aram So
Sogang University

METHODOLOGIES IN LEARNING
★ ●
Friday, 12 December
15:45–17:30
Educators Panels

SESSION CHAIR:
Russell Pensyl

Bridging the Gap Between Education and Professional Production
While there is a global interest in learning animation and special effects, the quality of academic programmes and training ranges from excellent to mediocre. It takes time and a great deal of skill, knowledge, and talent to develop global-quality education that meets the needs of today’s production companies, and the bar is raised higher every year.

In too many countries, get-rich-quick institutions advertise software training that at best provides comprehensive coverage of tool sets and techniques, and at the worst, certifies students who are completely unprepared for the careers they seek and with little or no knowledge of anything but the basic operation of a popular software programme.

Some countries have 500 or even 1,000 animation programmes (China for example) yet few have instructors who have worked and excelled in the industry. In addition, many instructors have received little or no training in effective and meaningful instructional techniques. The inevitable result: the quality of education is often very low, and graduates are completely unprepared for the career paths they want to follow.

As there is no professional certification for animators or visual effects professionals, it’s time to move toward a universally acceptable framework for specifying and evaluating the skills, portfolios, and show reels that are the fundamental entry point to prospective employment. Also, it’s essential to blend this framework into every employee’s upgrade path and lifelong learning plans in this rapidly evolving field.

The panelists have been dealing with these problems for many years, as educators, trainers, and recruiters. Their desire is see dramatic improvement in education and training through development of clearly defined professional requirements. Such a framework will make it easier for institutions to design relevant and high-quality education that meets the needs of today’s and tomorrow’s globally distributed production companies.

Robin King
Imagina Corporation

Prashant Buyyala
Rhythm & Hues Studios

Shelley Page
DreamWorks Animation

Michael Sehgal
Autodesk, Inc

Comparison of Animation Storyboard Education in China and the United States
More and more Chinese universities and schools have started teaching animation storyboard courses, but there is still a shortage of original work produced by the Chinese animation industry. This paper discusses the development of Chinese animation storyboard education and compares it to similar programmes in the US. The result is new insight into how to most effectively teach animation storyboarding.

The inquiry focuses, in part, on development of story and visual content, and how storyboard artists develop concepts. Animation storyboard programmes are compared through an examination of their curricula, faculty, 2D and 3D computer animation works, lab facilities, environmental and aesthetic aspects, and contrasts between the two cultures. Practical approaches to teaching are also discussed. The goal of this presentation is to provide an international perspective on animation storyboard education and a summary of the current state of Chinese animation.

Hui Zhu
Xiaobo Lu
Tsinghua University

Frank Suarez
Bunko Studios, Inc.

Using Animation and Interactive Virtual Technology to Create Interpretive Materials for Museum Learning and Promotion
Museums around the world have incorporated computer graphics, virtual reality, 2D and 3D animation, and interactive technology in gallery exhibits, educational games, films, and online presentations for many years. To move beyond the traditional ways of using technology to create interpretive materials for teaching and learning, and to communicate with its audiences, The National Palace Museum (NPM) in Taiwan embarked on two major digital projects: a 3D Virtual Exhibition System: Experience the Imperial Archives and “Adventures in the NPM,” a 13-minute 3D animation. This paper provides an overview of these projects.

In early 2003, NPM began to develop Experience the Imperial Archives. Through this system, users can virtually touch and interact with the famous Jadeite Cabbage, Ivory Ball, Carved Olive-Stone Boat, and Mao-Kung Ting from the museum collection. For the first time, users could experience the highest privileges of the emperor. The paper provides detailed evaluation before its manufacture. These things, and every aspect of its appearance can be visualised and made more accessible for the student of art history. This paper details interesting applications of the Adjusments menu, the Blend modes, and the Blend If values.

Marlin Constable
Nanyang Technological University

Deconstructing an Old Master Painting
Using Photoshop’s Advanced Toolset
An old master painting is a highly “made” thing, and every aspect of its appearance was subject to careful consideration and evaluation before its manufacture. These aspects can be very hard to grasp, but with Photoshop’s advanced toolset, they can be visualised and made more accessible for the student of art history. This paper provides an overview of these projects.
Chinese Whispers refers to the concept of mediating between remote studios with new forms of hybrid designing and real-time online collaboration. A sequence of experiments explored the concepts of linkage and slippage that occur at the boundaries of converging technologies as a means of generating innovative and unexpected design outcomes (real and virtual, tangible and intangible). The project is framed in a contemporary context with background research into current concepts and theories centered on learning ecology and user-generated design into future trends and state-of-the-art technologies.

Chinese Whispers involved linking hardware and software that are not immediately compatible in a remote networked environment to facilitate an educational design process in both remote and real environments. Through this process, students engaged in 3D scanning, downloading, visualising, analysing, remote simultaneous modelling in stereo, and deciding when to hit “3D print” at any given stage to invent a new design methodology.

Simon Fraser
Tim Miller
Morgan Barnard
Kris Henning
Victoria University of Wellington
School of Design
Mark Billinghurst
HIT Lab NZ

PEDAGOGY IN ACTION
★
Saturday, 13 December
10:30–12:15
Educators Papers

SESSION CHAIR:
Lucy Petrovic

Incorporating Animation Technologies Into Tools for Colonial American Education
This paper describes integration of animation and visual effects technologies into development of tools geared for colonial American education. Projects discussed include incorporation of crowd simulation software and full-body motion capture to recreate Revolutionary War battles, laser-scan acquisition of excavated archaeological artifacts, and recreation of historic structures with modelling and animation software. These technologies reduce the margin of error in representation, accentuate the level of realism for the end user, and create a more engaging educational presentation for schoolchildren.

Christopher Redmann
Drexel Petrovic

Wireless Sensor Network to Support a Multiple-Student Group Learning Game With One PC in the Classroom
Unlike the One Laptop Per Child concept promoted by the MIT Media Laboratory, this study utilizes a wireless sensor network to support a multi-student group-learning game with one PC in classroom. In the traditional computerised classroom, each student is equipped with one desktop (or laptop) computer for learning. This approach (one kid one desktop) has some disadvantages. For example, the cost of establishing the classroom is high, and students are confined to their seats during learning activities. It is adult-oriented, not kid-oriented.

This alternative approach, based on a wireless sensor network, allows students to interact with a computer via body motions, such as gestures, which is a much more natural way to use technology in the classroom. A set of ribbons with wireless gesture-detection sensors connects to a server. The ribbons are worn by the students, and the entire classroom’s gestures are captured and sent to the server.

With this technology, the classroom can be reconfigured from one kid one desktop to many kids one desktop. In one application, students are asked to create, share, and review stories using the gesture-detection ribbons in the classroom.

Yi-Shiang Lin
Ben Chang
National Central University

PROFESSIONAL/ACADEMIC
★
Saturday, 13 December
15:45–17:30
Educators Papers

SESSION CHAIR:
Pan Zhigeng

Teaching 3D Animation: The Balance Between Creative and Technical Skills
We are getting much better at teaching the technical skills that our students need to enter the visual-effects and 3D-animation industries. But sometimes these skills take precedence in our teaching, and we inadvertently give less emphasis to the more elusive creative skills that affect promotion into positions such as producers, visual effects supervisors, art directors, etc.

Superior quality and excellent story can make a big difference in the critical first eight seconds of a demo reel, when professionals decide whether to keep watching or hit the eject button. This paper covers not only the creative fundamentals, but also how to apply them consistently in our teaching, which in turn contributes to our students’ success after they graduate.

Craig Caldwell
Griffith University
Computer Games Degrees in the UK: A Review of Current Practice
This paper examines the development, content, and outputs of computer games development (CGD) courses in the United Kingdom. It provides a background of CGD courses, followed by a case study of how a Bachelors of Arts course was developed and implemented at Swansea Metropolitan University. And it analyses and discusses the characteristics of student applications (such as background qualifications, achievement levels, and skill-sets), the nature of student projects (including their themes, creativity, and quality), course structure and composition, and staff profiles. The results offer a unique and valuable insight into development of CGD courses, especially in view of their increasing importance in fostering new creative talent for games and games-related industries.

Barry Ip
Martin Capey
Swansea Metropolitan University

From Motion Capture to Interactive Animation
Jean-Marc Gauthier, director of the new animation and digital arts MFA program at Tisch School of the Arts Asia in Singapore, summarises the program’s curriculum: traditional animation, interactive animation, gaming, and motion studies applied to design.

His talk includes an overview of Life Motion Analysis: Ways to Visualise Motion From Real Life, a motion capture class designed for collaborative work among actors, dancers, storytellers, filmmakers, animators, and others.

Jean-Marc Gauthier
Tisch School of the Arts Asia,
New York University
SKETCHES
A dynamic forum for thought-provoking, speculative ideas, novel applications, what-if concepts, and behind-the-scenes production details. Following each sketch presentation, authors discuss future implications of their work and answer audience questions.

POSTERS
Graphic depictions of incremental or half-baked but innovative ideas displayed throughout the week with scheduled sessions for informal discussions.

Thursday, 11 December

SKETCHES FAST FORWARD SESSION
★ ● ○
Wednesday, 10 December
18:00–20:00

GPU-BASED METHODS
★ ○
Thursday, 11 December
08:30–10:00

SESSION CHAIR:
Edward Angel

GPU Crowd Simulation
This first interactive, GPU-accelerated massive crowd simulation (>65,000 agents) combines parallel implementations of a coarse global-path planning technique with a fine-grained local avoidance model.

Jeremy Shopf
Christopher Oat
Joshua Barczak
Advanced Micro Devices, Inc.

GPU-Based Scene Management for Rendering Large Crowds
A system for rendering crowds of characters with full shadows, in arbitrary environments, with stable performance and excellent visual quality, managing all aspects directly on the GPU.

Joshua Barczak
Natalya Tatarchuk
Christopher Oat
Advanced Micro Devices, Inc.

GPU Tessellation for Detailed, Animated Crowds
A method for rendering detailed crowds of characters using tessellation, instancing, and LOD management, along with a technique to reduce artifacts along UV seams when using displacement mapping.

Natalya Tatarchuk
Joshua Barczak
Budirijanto Purnomo
Advanced Micro Devices, Inc.

“A Star Wars: The Clone Wars” TV Series: Making the Impossible Happen
In creating episodes of “Star Wars: The Clone Wars,” s flexibility is the key. It requires an adaptable pipeline and lighting tools that enable completion of several tasks in one render calculation.

Ryan T. Smith
Lucasfilm Animation Singapore

The Invisible Art Behind “Ironman”
What is real and what is not? In “Ironman,” suspension of disbelief due to the larger-than-life action and realistic backgrounds was the ultimate goal for matte painters.

Danny Janevski
Lucasfilm Animation Singapore

Keeping It Real: Classical Art Principles in Today’s VFX Features
The tools have changed, but it is still the artist’s process, rooted in the knowledge of basic artistic principles, that make visual effects convincing and realistic.

Kalene Dunsmoor
Lucasfilm Animation Singapore

Lighting Clone Wars:
A New Planet Every Week
How to bring the vast Star Wars universe to TV without making it look small? The challenge of introducing new characters and locations in every episode, on a TV production schedule.

Ben Huber
Lucasfilm Animation Singapore

RECEN'T PRODUCTION TECHNIQUES AT LUCASFILM ANIMATION SINGAPORE
★ ○
Thursday, 11 December
13:45–15:15

SESSION CHAIR:
Ken Anjyo

“Star Wars: The Clone Wars” TV Series:
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Ben Huber
Lucasfilm Animation Singapore
Clone Wars Animation in Lucasfilm Animation Singapore
What does it take to animate “Star Wars: The Clone Wars?” From stills and shots, learn how animators bring the Star Wars universe and its colorful characters to life.

Ullas Narayana
Lucasfilm Animation Singapore

INTERACTIVE TECHNIQUES ★ ●
Thursday, 11 December
15:45–17:15
SESSION CHAIR:
Matt Adcock

Balance Ball Interface
Only the user sits on the balance ball, and this system captures the user’s rough motion and behaviour.

Masasuke Yasumoto
Tokyo University of the Arts

Fu-Fuu: An Interactive Game Using Breath Control
A novel game interface that uses a player’s position and breath captured via a camera and a microphone to manipulate a virtual paper airplane.

Taichi Nishiyori
Soel Sato
Toki Takeda
Ryoichi Ando
Maki Terai
Takeotshi Ushimara
Reiji Tsuruno
Kyushu University

Tracking the Position of a Mobile Device on Interactive Screens With RFID
A novel method for identifying and tracking the position of mobile devices on interactive screens and a prototype system of the proposed method.

Sang-Jun Han
Kuk-Hyun Han
Pl Seung Yang
Bo Hyun Kyung
Samsung Electronics

Bear’s Beer and Smart Platter - Handheld Interactive Haptic Display
A new tray-shaped force-feedback display with an interactive robot and a vision-based positioning system. This method enables haptic interaction in handheld devices.

Tomohiro Amemiya
NTT Communication Science Laboratories

Shariuki Ando
Taro Maeda
Osaka University

ARTS & ROBOTS ★ ●
Friday, 12 December
08:30–10:00
SESSION CHAIR:
Daniel Maskit

Shadow Play
A method for computer-aided shadow play, where shadows cast on a screen are saved and projected back onto the screen. Users can create an environment with butterflies that are controlled by user shadows.

Cem Sina Cetin
Sabanci Universitesi

Automatic Composition for Contemporary Dance Sequences
An automatic composing system for contemporary dance using 3D motion data. Instead of creating completed connections, this method creates conceptual sequences for dance lessons.

Asako Soga
Ryukoku University

Bin Umino
Toyo University

Motoko Hirayama
University of Tsukuba

Nervixx: Introducing Biosignals to Live Video Performance
A video performance system based on EEG (the most informative of the biosignals) and EMG (highly controllable) data.

Satoru Tokuhisa
Keio Research Institute at SFC

Rendering Lots of Robots
An outline of the lighting pipeline tools and tricks used at Double Negative to render the Golden Army for “Hellboy 2: The Golden Army”.

Katherine Roberts
Graham Jack
Double Negative

PHOTOGRAPHS & DRAWINGS ★ ●
Friday, 12 December
10:30–12:00
SESSION CHAIR:
Diego Gutierrez

Forward Lean–Deriving Motion Illustrations From Video
Forward Lean extracts moving objects from a video sequence and then illustrates the objects’ motions in a single static image by shearing the image into the direction of its motion.

Marc Nienhaus
mental images GmbH

Holger Winnemöller
Adobe Research Inc.

Bruce Gooch
University of Victoria

Automatic 3D Caricature Generation By Learning in Enlarged Manifold Space
Lack of samples makes it challenging to generate 3D caricatures by machine learning. In this method, a training set is enlarged by reconstructing 3D caricatures, and then a regressive model is learnt by manifold regularization.

Junfa Liu
Chinese Academy of Sciences

Visualising Adaptive Clusters of Digital Photographs
With this visualisation method, which considers semantic flow in each cluster, users can select references from a specific camera for smart visualisation if concurrent photos are used as input data.

Chuljin Jang
Hwan-Gue Cho
Pusan National University
Clean up Your Image Using Internet Photo Collections
An algorithm that uses images from internet photo collections to remove user-identified occlusions in an image and faithfully reconstruct the image data that should have been displayed.

Hanieh Taipalus
Helsinki University of Technology
Satoshi Kondo
Matsushita Electric Industrial Co., Ltd.
Takafumi Aoki
Tohoku University

Curves, Planes, and Terrains
Friday, 12 December
13:45–15:15

Session Chair: Olga Sorkine

Single-View Sketch-Based Modelling From Construction Lines
A new modelling-from-sketches system in which models are made of simple parts drawn with only two strokes, and all the strokes are drawn from a single viewpoint.

Alexis Andre
Suguru Saito
Masayuki Nakajima
Tokyo Institute of Technology

Interactive Control of 3D Class-A Bézier Curves
For design of highly aesthetic curves, this interactive technique controls 3D, class-A Bézier curves by specifying the two end-points and their tangents.

Ryo Fukuda
Norimasa Yoshida
Nihon University

Takafumi Saito
Tokyo University of Agriculture and Technology

Hexagonal Geometry Clipmaps for Spherical Terrain Rendering
A unified representation of hierarchical triangular mesh and geometry clipmaps using hexagonal geometry clipmaps to render spherical terrain with uniform sampling on the sphere and fast rendering.

Shibien Bhattacharjee
P. J. Narayanan
International Institute of Information Technology, Hyderabad

Relief Clipping Planes for Real-Time Rendering
A technique for performing clipping and capping of arbitrarily shaped solids against clip planes with an additional height or offset map.

Matthias Trapp
Universität Potsdam
Jürgen Döllner
Universität Potsdam

Volumes
Friday, 12 December
15:45–17:15

Session Chair: Baoquan Chen

Optimised Volume Sampling Based on Manipulation Points for Volume Deformation
A volume-sampling mesh that is optimised to users’ dynamic manipulation and the volume data used for interactive volume deformation.

Kei Wai Cecilia Hung
Megumi Nakao
Kotaro Minato
Nara Institute of Science and Technology

Curvature-Based Volume Visualisation of Local Structures
A new curvature-based transfer function for interactive volume visualisation and mining of local structures. The visualisation results are obtained in real time by GPU computing.

Yu Hirata
Megumi Nakao
Tadao Sugiura
Kotaro Minato
Nara Institute of Science and Technology

Rigid-Body Interaction in SPH
A new boundary force based on collision to solve rigid-body interactions in SPH. This method produces more physically feasible results in rigid-rigid interaction than the existing method.

Seungtaik Oh
Younghee Kim

Visualisation Simulation
Saturday, 13 December
08:30–10:00

Session Chair: Geoff Wyvil

A Visual Simulation for Gold Leaf and Japanese Lacquerware

Tetsuyuki Minamihara
Maki Terai
Reiji Tsuruno
Kyushu University

Fire Simulation and Rendering for “Hellboy 2: The Golden Army”
How Double Negative developed a new fluid simulation system for the pyrokinetic character Liz, resulting in fast, highly detailed fire simulations and renders.

Eugenie von Tunzelmann
May Leung
Double Negative Visual Effects

Rigorous Simulation of the Process of Glottal-Wave Generation Using a GPU
A FDLB (compressible and thermal fluid)-MPS(new anisotropic elastics model) coupling method using GPU to directly simulate the process of glottal-wave generation during human phonation.

Kazuhiko Yamamoto
Kyushu University

LIGHTING & REFLECTANCE

Saturday, 13 December
10:30–12:00

SESSION CHAIR:
Wojciech Jarosz

B-Spline Volume vs. Other BRDF Models
This sketch shows that the B-spline volume representation is more suitable for fitting to measured BRDF data than two popular analytical models such as Cook-Torrance and Lafortune.

Joo-Haeng Lee
Electronics and Telecommunications Research Institute

SPARTA: A Scalable Architecture for Ray-Tracing Applications
A low-cost, scalable hardware and software infrastructure for high-performance, interactive ray tracing of very large models that will target large-scale visualisation applications.

Ross Brennan
Michael Manzke
Trinity College Dublin

Spatial-Directional Radiance Caching
Spatial-directional radiance caching accelerates indirect illumination computation on arbitrary glossy surfaces. The main idea is to perform lazy indirect illumination evaluation in both the spatial and directional domains.

Václav Gassenbauer
Czech Technical University in Prague

Jaroslav Křivánek
Cornell University

Fast, Approximate HDR Image-Based Lighting Using Summed-Area Tables
A method to rapidly generate higher-order summed-area tables that allows multiple tables to be generated dynamically while maintaining interactive frame rates.

Justin Hensley
Advanced Micro Devices, Inc.

Thorsten Scheuermann
Valve Software

CALIBRATION & ACQUISITION

Saturday, 13 December
13:45–15:15

SESSION CHAIR:
Craig Donner

Image-Correction Method for Multi-Projector Display Using SIFT Features
An image-correction method for multi-projector display that corrects geometric transformation of projected images using feature points in images instead of the special patterns.

Toru Takahashi
Norihito Numa
Tatsuya Kawano
Takafumi Aoki
Tohoku University

Satoshi Kondo
Matsushita Electric Industrial Co., Ltd.

Gloss and Normal Map Acquisition Using Gray Codes
This technique for gloss and normal map acquisition of fine-scale specular surface details provides an efficient and easy method employing only ubiquitous hardware components.

Yannick Francken
Tom Cuypers
Tom Mertens
Philippe Bekaert
Universiteit Hasselt

Considering Shape Reconstruction from Specular Reflection
This method considers the availability of 3D measurement of specular objects when simulating with CAD rendering software.

Tomohito Masuda
Toppan Printing Co., Ltd.

Abhijit Ghosh
Wan-Chun Ma
University of Southern California

Hiroti Unrten
Toppan Printing Co., Ltd.

Paul Debevec
University of Southern California

POSTERS

Thursday, 11 December–Saturday, 13 December
09:30–18:30

Automatic Data-Extracting Software for Retrieval of Lifetime Photos Using Scent Information

Young ah Seong
The University of Tokyo

Yasuaki Kakehi
Keio University

Jean-Jacques Delaunay
Takeshi Naemura
The University of Tokyo

Enhancing Procedural Animations With Motion Capture Data

Chang-Hung Liang
Tsai-Yen Li
National Chengchi University

Fast Plausible 3D Face Generation From a Single Photograph

Akinobu Maejima
Shigee Morishima
Waseda University

Flaneur: Digital See-Through Telescope

Hiroshi Sakasai
Hiroshi Kato
Takako Igarashi
Miho Ishii
Masahiko Inami
Naohito Okude
Masa Inakage
Keio University
Sketches & Posters

Thursday, 11 December – Saturday, 13 December

- Green Graphics: Feedback Control for Energy-Efficient Rendering
  Gabriyel Wong
  Jianliang Wang
  Nanyang Technological University

- High-Speed Hand Tracking for Gesture Recognition
  Takafumi Aoki
  Tokyo Institute of Technology

- Interactive Animation of Waterdrops With Particle-Based Fluid Simulation
  Takuya Abe
  Masataka Imura
  Sei Ikeda
  Yoshitsugu Manabe
  Kunihiro Chihara
  Nara Institute of Science and Technology

- Kime Pose Anime in Japanese Style Using Action-Line Control
  Satoshi Cho
  Kanagawa Institute of Technology

- Real-Time Composition Pre-Visualisation System
  Hye-mi Kim
  Jungjae Yu
  Jae-Hean Kim
  Electronics and Telecommunications Research Institute

- Shade Pixel: Interactive Skin for Ambient Information Displays
  Hyunjung Kim
  Boram Lee
  JinHa Seong
  Woohun Lee
  Korea Advanced Institute of Science and Technology

- Toward Multi-View Photometric Stereo for Body-Shape Measurement
  Yusuke Yoshiyasu
  Keio University

- Twist-and-Stretch: A Shape Dissimilarity Measure Based on 3D Chain Codes
  Victor Lopez
  Universidad Nacional Autónoma de México

- Kime Pose Anime in Japanese Style Using Action-Line Control
  Irene Cheng
  University of Alberta

- Toward Multi-View Photometric Stereo for Body-Shape Measurement
  Ernesto Bribiesca
  Universidad Nacional Autónoma de México

- Twist-and-Stretch: A Shape Dissimilarity Measure Based on 3D Chain Codes
  Tao Wang
  Anup Basu
  University of Alberta
<table>
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<tr>
<th>Exhibitor List</th>
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<tr>
<td><strong>3D Consortium</strong></td>
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<td><strong>3DSense Media School</strong></td>
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<td><strong>A*Star c/o Institute for Infocomm Research</strong></td>
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<td><strong>Academy of Art University</strong></td>
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<td><strong>Advanced Micro Devices, Inc. AMD</strong></td>
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<td><strong>Animation Magazine</strong></td>
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<td><strong>Animation Reporter</strong></td>
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<td><strong>Anya Animation Company</strong></td>
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<td><strong>Association of Machinima Arts &amp; Sciences</strong></td>
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Co-located Workshops & Events

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

www.machinima.com.sg

Machinima Symposium 2008
Friday, 12 December 2008
Saturday, 13 December 2008
Suntec Singapore International Convention and Exhibition Centre

Ascertained the future visage of Machinima, its making, distribution and consumption. Acquire knowledge from industry players expounding on the new trade. Gather tips and techniques from international experts on the scene, explore new terrains and delve deep into the arts and sciences of Machinima making and expression.

www.machinima.com.sg

www.vrcai2008.org

7th ACM SIGGRAPH International Conference on Virtual-Reality Continuum and its Applications in Industry (VRCAI 2008)
Monday, 8 December 2008
Tuesday, 9 December 2008
Biopolis

An exciting VRCAI 2008 awaits participants from both academia and industry in Singapore, a hotbed of innovation where state-of-the-art technologies and applications in the virtual reality continuum (VRC) will be explored and presented. Spanning next-generation info-communication environments such as virtual reality, augmented virtuality, augmented reality, and mixed reality. VRC is key to defining and interacting, with and within, our virtual worlds. Advances in research and novel applications in this field have revolutionised much of our leisure activities, making them more appealing and fun. Just as significantly, these advances provide the foundation for more effective interactivity in work- and learning-related activities.

www.vrcai2008.org
**RESOURCES & POLICIES**

Suntec Singapore International Convention & Exhibition Centre

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- Children under 16 are not permitted in the Exhibition. Age verification is required.

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The Suntec Singapore International Convention & Exhibition Centre is handicap-accessible. If you have special needs or requirements, please contact Conference Management.

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There are several ATMs located throughout the lobbies of the Suntec Singapore International Convention & Exhibition Centre.

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A variety of coffee shops, snack bars, and restaurants are available in the convention centre and the adjacent Suntec City Mall. For Stand Catering Services, exhibitors are required to contact Suntec Singapore at +65.6825.2077 (Danielle Lim). Outside food and drinks are strictly not allowed within the convention centre.

**PARKING**
SIGGRAPH Asia 2008 attendees can park at Basement 1 (B1) of the Suntec Singapore International Convention & Exhibition Centre.

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- Mondays to Fridays (except Public Holidays):
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  - 17:00–midnight: $2.14 flat per entry
- Midnight–07:00 the next day:
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- Saturdays, Sundays, and Public Holidays:
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(All charges are inclusive of GST)

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

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Child care is not provided at SIGGRAPH Asia 2008. Contact your hotel concierge for suggestions.

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- Lost badges will not be replaced. If you lose your badge, you must register again at the published rates to obtain a new badge.
- Technical materials included with your registration must be picked up at the SIGGRAPH Asia 2008 Merchandise Pickup Centre. Lost merchandise vouchers will not be replaced.
- To be admitted to the Reception, you must have a ticket. (Your badge does not provide access)
- Attendees under the age of 16 must be accompanied by an adult at all times. Age verification is required.
- No cameras or recording devices are permitted at SIGGRAPH Asia 2008. Abuse of this policy will result in the loss of the individual's registration credentials.
- SIGGRAPH Asia 2008 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 Asia 2008 or ACM SIGGRAPH.

**EXHIBITION HOURS**
Level 4, Halls 401 & 402
- Thursday, 11 December: 09:30–18:30
- Friday, 12 December: 09:30–18:30
- Saturday, 13 December: 09:30–18:30

**CONFERENCE HOURS**
10 December to 13 December: 08:00–18:00
Registration is open from 08:00 to 18:00 daily.

**TRAVEL & HOUSING**
**Travel**
If you are traveling from the US to SIGGRAPH Asia 2008, please contact Pleasant Holidays at 800.877.8111 or airfare@siggraph.org to obtain special travel rates. Please inform Pleasant Holidays that you are attending the SIGGRAPH Asia 2008 conference to enjoy these rates.

**Housing**
Please make your hotel reservations by 7 November 2008. Reservations made after 7 November 2008 will be based on availability and SIGGRAPH Asia 2008's discounted rates may not apply.

Visit SIGGRAPH Asia 2008’s Official Travel Agent to access the easy-to-use online hotel reservation system, which includes complete information on housing policies, procedures, and rates:

**Or contact:**
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jeron@orient-explorer.com

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SIGGRAPH Asia 2008 provides a one-way complimentary shuttle service between conference hotels (not within walking distance) and the Suntec Singapore International Convention & Exhibition Centre every morning. Please check the departure times with the hotels.

Important notice: The SIGGRAPH Asia 2008 Shuttle Service is available only to attendees who register at official conference hotels through the SIGGRAPH Asia 2008 hotel reservation system. All attendees must have a SIGGRAPH Asia 2008 badge to board the Shuttle Service.

AIRPORT TRANSFER

Airport transfers can be arranged through SIGGRAPH Asia 2008’s Official Travel Agent. The airport transfer is S$ 70.00 nett per way per car (Mercedes). If passenger pick up is between 23:00 and 07:00 hours, an additional fee of S$ 15.00 nett will be applicable.
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