# siggraph 20♦7
## Animation Theater Program Part II

SIGGRAPH 2007

**DVD** VIDEO



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## Animation Theater Program Part II

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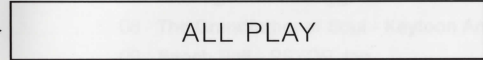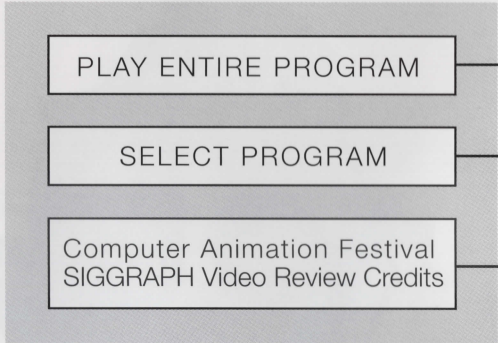
SIGGRAPH 2007

# siggraph 2007

## Animation Theater Program Part II

ACM SIGGRAPH Video Review Issue 158

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Due to the DVD production process some titles appear different than the original submitted work.

## 01 **49**

7:15

In an anonymous country, a man works at a base that is equipped with powerful missiles. Today is his son's birthday, and he has just finished making a model plane that he has been secretly creating in his spare time.

He intends to give the plane to his son as a present when he returns home. However, just when the day's work is coming to an end, the telephone rings. He wonders what it can be ...This is a story of the paradoxical situation in which a typical father wishes peace and happiness for his family, though he works at a place where weapons of mass destruction exist. We also live in a complex society where happiness and anxiety are interwoven. This work is a metaphor that expresses this kind of situation.

Production: Character design was achieved through sketches and modeling clay based on polygonal modeling. Texture was achieved by scan-reading painted objects, making adjustments to them, and then pasting them onto polygonal models. Total production time: 39 months; Writing the story and producing the storyboard: 24 months; CG production: 15 months

Hardware: PC Intel Pentium 4, 2.8GHz CPU, 1GB RAM
Software: Autodesk 3ds Max; Adobe After Effects, Photoshop

Director/Producer: Ichiro Iwano
Contributors: Story, Design, Animation: Ichiro Iwano
Music: Keiji Fujii

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## 02 **Olis Chance**

9:56

On a late summer afternoon Oli, a 12 year old boy, plays lazily on a railway track. After almost getting caught by a passing train, he wanders off into a deserted train depot. To his surprise, he meets a group of children on the depot, who seem to be just as lost as he is. He befriends them, and each of them seems to have his own story to tell, stories changing Oli's view on the afternoon he thought to have spent amongst new friends.

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Directors: Saschka Unseld, Johannes Weiland
Producer: Carsten Bunte
Contributor: Character Design: Jakob Schuh

## 03 **Fetch!**

1:16

Colin takes his dog Cumberland to the park for a game of fetch, but Cumberland has other ideas.

Software: NewTek LightWave; Adobe Photoshop, Premiere

Director: Dana Dorian
Producer: Sam McCarthy
Contributors: Writer: Dana Dorian
Animator: Steve Townrow
Voice: Gareth Howells
Art Director: Jon Beeston
Lighting, Compositing: Nuno Conceicao
Music, Sound Effects: Joris De Man

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## 04 **VERSUS**                                            5:42

From two islands lost in the ocean, two
samurai clans fight for a little island.

Directors: François Caffiaux, Romain Noel,
Thomas Salas
Producers: Marie Anne Fontenier,
Supinfocom Valenciennes
Contributor: Distributor: Annabel Sebag

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## 05 **clikclak**                                          5:34

Two robots and a young boy try to communicate.

Directors: Aurélie Fréchinos, Victor-Emmanuel
Moulin, Thomas Wagner
Producers: Anne Brotot, Supinfocom Arles
Contributor: Distributor: Annabel Sebag

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## 06 **It's JerryTime!: The Big Time**                     3:39

"It's JerryTime" is an original animated web-series based on the true-life
misadventures of Jerry, a middle aged single guy who's life is just a bit
tougher than it should be. Published quasi-monthly, each episode is a
2D mashup of digital photos and clip art. The series, created by Jerry
and Orrin Zucker, was the first podcast to be nominated for an Emmy
Award.

In this episode, entitled "The Big Time", Jerry recalls his early days trying
to break into showbiz, including an unfortunate incident when he was
cast as a sheep in a mattress commercial.

Hardware: Mac
Software: Adobe After Effects,
Photoshop; e frontier Poser

Director: Orrin Zucker
Producer: Ozone Inc.
Contributors: Writer, Composer: Jerry Zucker
Animator: Orrin Zucker

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## 07 **Alter Ego**                                         6:54

Somewhere in the wilds, there is a tower sheltering an aging Jester's
solitude. There, a sullen weirdo feeds on dreams about his own
greatness. Secluded from the world and reality, he seems not to notice
how much his life differs from the idealized image of himself. He doesn't
notice his funny habits, his clumsiness or the appearances of glamour of
his surroundings. He derives satisfaction from the little pleasures of the
everyday, which give him a delusion of life in a better world. This vision
is so real that it becomes an obsession in which the Jester loses his
identity.

Software: Autodesk 3ds Max; Adobe After Effects, Photoshop

Director: Kuba Gryglicki
Producer: Maciej Cwiek
Contributors: Studio Mansarda
Writer, Director, Designer, Animator: Kuba Gryglicki
Music: Zbigniew Kozub
Musicians: Lech Balaban, Agnieszka Balaban, Zbigniew Kozub
Sound: Zbigniew Kozub
Voice: Krzysztof Kowalewski

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## 08 **The Grandfather of Soul**          2:00

On the heels of the very sad news of James Brown's passing, Keytoon Animation Studio is proud to present their latest animated short entitled "The Grandfather of Soul". The short celebrates the soul and energy of the unforgettable James Brown hit "I Got You" with a comical music video of an old man getting his groove on in the privacy of his own home, or so we think.

Software: Autodesk 3ds Max; Next Limit Maxwell Render; Adobe Photoshop, After Effects; Apple Final Cut Pro

Director: Jaime Maestro
Producers: David Lacruz, Cecile Hokes
Contributors: Executive Producer: Nina Rowan
Lighting, Texturing Director: Jonatan Catalan
Compositing Supervisor: Santi Agusti
Animation Supervisor: Daniel Peixe
Rigging: Luis San Juan, Rudi Hammad
Audio Post: Splash Studios NYC
Sound Design, Mix: Peter Levin
Sound Editors: Barbara Parks, Alex Noyes, Neil Benezra
Music: I Got You (I Feel Good), James Brown, Fort Knox Music Inc., Warner Chappell Music Spain, S.A.
Keytoon Team: Alex Mateo, David Cuevas, Jonathan Cuevas

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## 09 **Beach Ball**          1:02

For this spot the task was to create a 3D beach ball in the image of the Pepsi 'globe' logo. The idea was to have the ball look photorealistic and natural as if this global beach ball game was actually taking place. Crowds and locations were complete in camera with a few crowd scenes built using 3D crowd simulations.

Software: Autodesk Flame; SOFTIMAGE|XSI; Silhouette Roto

Director: Sam Bayer
Producers: Sarah Dowland, Bernadette Castillo
Contributors: Visual Effects: MassMarket
Lead Flame: Chris Staves
Flame Artists: Patrick Ferguson, Brian Benson, Jaime Aguirre, Dave Elkins

VFX Executive Producer: Justin Lane
VFX Producer: Sarah Dowland, Bernadette Castillo
CG Artists: Pakorn Bupphavesa, Jacob Slutsky, Young Jang, Florian Witzel, David Barosin, Kris Rivel, Paul Liaw, Laurent Barthelemy
Designer: Zoe Wishart

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## 10 **Beck "Girl"**          3:28

When considering how to visually represent the lighthearted tone and dark lyrics of Beck's "Girl", Motion Theory found inspiration in Al Jaffee's classic fold-ins for Mad magazine, creating real-life scenes where reality seems to fold-in on itself. Throughout the video, Beck travels and performs the song, moving through naturalistic settings in East L.A., Boyle Heights, and McArthur Park, the genuine, culturally vibrant sides of Los Angeles that often get lost behind the glitz of Hollywood and Beverly Hills. The three-day shoot employed local artists to create murals and miniature neighborhoods, and local mariachis to play along with Beck near a wall famously known as 'Mariachi Corner'.

Directors: Mathew Cullen, Grady Hall
Producer: Scott Gemmell
Contributors: Artist: Beck
Label: Interscope Records
Video Commissioner: Kathy Angstadt
Production Company: Motion Theory
Executive Producer: Javier Jimenez
DP: David Morrison
Production Designer: Matthew Holt
Post Production: Motion Theory
Creative Directors: Mathew Cullen, Grady Hall
Art Director: Jesus de Francisco
Artists: Martha Rich, Kevin Christy, Ethan Marak, Gary Garay
Visual Effects Supervisor: Vi Nguyen
Assistant Visual Effects Supervisor: Gabriel Dunne
Compositing: Phil Pham, Matt Motal, Mike Slane
Designers, Animators: Kirk Shintani, Jesse Franklin, Christopher Janney, Linas Jodwalis, Christopher Leone, Mark Lai, Juston Hsu
Editor: Jeff Consiglio (Motion Theory)
Colorist: Clark Mueller (Riot)

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## 11 Chevrolet "Buildings"   :53

The 60 second entirely computer generated hi-definition commercial was completed by The Embassy Visual Effects, Vancouver for Chevrolet Mexico and advertising agency McCann Erickson Mexico. Based on an original concept from McCann's creative VP and directed by The Embassy, the spot features 5 Chevrolet SUVs driving aggressively over a glass and steel structure which eventually reveals itself to be a 110 story building in the centre of a fictional metropolis.

Software: SOFTIMAGE|XSI; Newtek LightWave; Apple Shake; Custom software

Directors: The Embassy Visual Effects Inc., Vancouver
Producer: Charlie Bradbury
Contributors: VFX Supervisor: Simon van de Lagemaat
Lead CG Artist: Michael Blackbourn
CG Artists: Marc Roth, Paul Copeland, Dan Prentice
Senior Compositor: Stephen Pepper
Compositor: David Casey

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## 12 La Marche des Sans Nom   5:29

The destiny of a soldier in the middle of a battlefield.

Directors: Jean Constantial, Nicolas Laverdure, Lucas Vigroux
Producers: Anne Brotot, Supinfocom Arles
Contributor: Distributor: Annabel Sebag

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## 13 13 Ways to Die at Home   2:26

Poison toads, missing socks and carpet leeches. So many ways to die at home!

Software: Autodesk Maya; Adobe After Effects; Apple Final Cut Pro

Director/Producer: Lee Lanier

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## 14 Esc   4:00

A mouse cursor creates a 3D character that comes to life after an unknown program error and begins a journey across the computer desktop.

Software: Autodesk 3ds Max; Adobe Photoshop, Premiere, After Effects

Director/Producer: Justin Henton
Contributor: Music: Michael Creber

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## 15 Moutons   5:41

Are sheep born in the froth of waves?

Directors: Simon Blanc, Vivien Cabrol, Arnaud Valette
Producers: Anne Brotot, Supinfocom Arles
Contributor: Distributor: Annabel Sebag

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## 16 **Respire, Mon Ami - Breathe, My Friend**   2:11

Set in France, a lonely child finds companionship with an unlikely friend.

Hardware: HP Workstations
Software: Autodesk Maya; Pixar RenderMan; Adobe Shake, Photoshop, Premiere; MAXON BodyPaint3D; Luxology Modo; SyFlex; Tsunami

Director: Chris Nabholz
Producer: Ringling School of Art and Design
Contributors: Animation, Story: Chris Nabholz
Voice: Katherine Tanner
Music: The Music Bakery
Faculty Advisor: Heather Thomson
IT Department: Karissa Miller, Jennifer Bradley, Rosa Disla, Iva Lovell

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## 17 **The Animator and the Seat**   2:09

Chunk has been awake for an immeasurable amount of time, slaving away in his cubicle on an animation that is long overdue. Armed only with caffeinated beverages, Chunk must overcome his animated struggles and fatigue-induced hallucinations without going completely insane. He has wrongly assumed, however, that the only comfort available to him is that of his warm, padded computer chair. He does, in fact, have no comfort available to him, and his chair is out to prove that.

Software: Autodesk Maya; Apple Shake; Pixar RenderMan; Adobe Photoshop, Premiere; Tsunami

Director: Eric Drobile
Producer: Ringling School of Art and Design
Contributors: Animation: Eric Drobile
Music: Bill Drobile III
Faculty Advisor: Jim McCampbell

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## 18 **Space**   2:29

Two kinds of Aliens meet, and struggle to find peace. Finally, they create a tap dancing performance.

Hardware: Intel 1.83 GHz, 1 GB RAM
Software: Autodesk Maya; Adobe Premiere

Director/Producer: Sang yeong Jeong
Contributors: Effects: Ji Woon Hwang
Title Illustration: Miae Kim

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## 19 **Space Shower Hot**   :39

Inspired by 1980's deadtech, cyberpunk, junk art and industrial style.

Hardware: PC, Intel Xeon 3.2 GHz Dual, 2GB RAM
Software: Autodesk Maya, Combustion, Flint; Matchmove

Directors: Synichi Yamamoto, Yasuo Koga
Producers: Yoshifumi Sadahara, Akinori Kojima
Contributors: CG Artists: Yasuo Koga, Tetsuaki Matsumoto
Music: SALAD
Masaomi Shiratori, Sohei Saito, Takashi Sugisaki, Junya Hirasawa, Kentaro Ohira, Wakako Sekine

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# 20 **Chocolate Pillows** :50

In a series of adventures we find out that there is more in the Chocolate Pillows than one can expect.

Hardware: PCs, Octane, Tezro; Rendering farm: 10 CPUs
Software: Autodesk Maya, mental ray, Flame, Combustion; Shake;
Adobe After Effects

Director: Yariv Gaber
Producer: Kadishzon Production Ltd.
Contributors: Agency: Bauman Bar Rivanay
VFX Animation: Gravity Visual Effects & Design

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# 21 **Aditya Birla Group India** 1:00

We travel across continents with the flow of elements which interact with various people, forming the identity and logo of Aditya Birla Group of India.

Hardware: PCs; Octane Tezro; Rendering farm: 10 CPUs
Software: Autodesk Maya 6, mental ray, Flame, Combustion; RealFlow, Shake; Adobe After Effects

Director: Yariv Gaber
Producer: Adi Shoval
Contributors: VFX Animation: Gravity Visual Effects & Design

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# 22 **The Fallen Oak** 2:42

HMS Royal Oak is the largest maritime war grave in the Northern Hemisphere, sunk by U-boat torpedoes while at anchor in the early weeks of WWII in Scapa Bay, Orkney. This Sovereign class warship was the final resting place of 833 sailors. The wreck has been leaking oil for the past 67 years and has led to attempts by the Ministry of Defense's Marine Salvage team to prevent damage to the local environment.

The images show the impact damage of the four torpedoes that sank the ship. One of the most powerful images is of the starboard side of the upturned hull in which a bite appears to have been taken out of the bow where the first torpedo struck. The 3D images have been animated using digital cinematography techniques to allow the viewer to explore the wreck in detail. The effect of movement across the wreck site gives a much clearer understanding of the structure.

Hardware: Point cloud data gathered with Reson multi-beam sonar technology
Software: IVS 3D Fledermaus; Autodesk Maya; Custom 'WreckSight' plug-ins

Director/Producer: Chris Rowland

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## 23 **27 Storms: Arlene to Zeta**    4:53

This visualization shows all 27 named storms that formed in the 2005 Atlantic hurricane season and examines some of the conditions that made hurricane formation so favorable. Many records were broken during the 2005 season, including the most hurricanes, the most at Category 5, and the most intense hurricane ever recorded in the Atlantic as measured by atmospheric pressure.

The animation begins by showing the regions of warm water that power the hurricanes advancing northward through the peak of hurricane season and then receding as the waters cool. Strong shearing winds in the troposphere can disrupt developing young storms, but measurements indicate that there was very little shearing wind activity in 2005 to impede storm formation.

This visualization shows actual data that NASA and NOAA used to predict the paths and intensities of hurricanes. Satellite data plays a vital role in helping us understand the land, ocean, and atmosphere systems that have such dramatic effects on our lives.

Hardware: Dual Linux systems running Fedora Core 4; Dual Mac running OS-X 10.4
Software: Adobe Photoshop, After Effects; Autodesk Maya; Pixar RenderMan; RSI IDL; Custom software, shaders, scripts

Director: Gregory W. Shirah
Producer: Dr. Horace G. Mitchell
Contributors: B. Alex Kekesi, Lori Perkins, Stuart A. Snodgrass, Michael Starobin, Marte Newcombe, Randall Jones, Kevin Mahoney, Mike Velle, Jeff Halverson, Jesse Allen, Jeff de La Beaujardiere, Tom Bridgman, Cindy Starr, Eric Sokolowsky, Joycelyn T. Jones, Vicky Weeks, James W. Williams

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## 24 **Magic Fluid Control**    2:32

Three clips to showcase the possibilities of controlled water simulations. Two of them involve a magician that creates fluid figures. The third one shows a fluid flowing up several stairs and forming a human figure. The water is simulated using the lattice Boltzman method and is controlled using particles which define local force fields. They are generated automatically from either a physical simulation or a sequence of target shapes. At the same time, as much of the natural fluid motion as possible is preserved.

Software: Blender; GIMP;
Custom LBM Fluid Solver

Director: Nils Thuerey
Producer: Mark Pauly
Contributors: Richard Keiser, Ulrich Ruede

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## 25 **Capturing and Animating Occluded Cloth**    :49

This video demonstrates results from a new method for cloth motion capture which can produce detailed surface meshes for full garments. Traditionally, capturing complicated deforming surfaces such as cloth has been difficult due to substantial self-occlusion and folding. This method overcomes these problems by preserving physical characteristics of the cloth and by filling holes using a data driven model. Examples include a dancing actor in a full garment, a heavily wrinkled sleeve, and a rag interacting with a solid object. It also demonstrates re-use applications of cloth capture data by binding skeletal mocap data to a data-driven skinning system.

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Hardware: Foculus FO214C; Nikon D200, D50; Perfection sewing machine kit
Software: MathWorks MATLAB; Luxology Modo; NewTek LightWave; Adobe Photoshop, Illustrator, Premiere; Custom software

Directors/Producers: Keenan Crane, Ryan White, David Forsyth

## 26 Venus Venus                                      4:00

Venus was as beautiful inside, as out.

First ever 3D laser measurements of the Venus de Milo resulted in 'point cloud data' composed of tens of millions of points, which are beautiful as they are, allowing us to focus on the artistic form of the statue, and on the intentions of the creator thousands of years ago. But, when full texture was applied, it started to tell a story, as well as arouse questions.

How did the goddess of love and beauty come to the Louvre Museum from the island of Melos, Greece where she was found? How were the statue's missing arms arranged? When was she made? Who made her? She herself is a mystery wrapped in enigma.

"Venus Venus" made its debut at a 3D stereogram theater inside The University Art Museum of the Tokyo National University of Fine Arts and Music in Tokyo, as part of an exhibition called "Ancient Greek Art from the Louvre Museum," which opened in June, 2006. Minor change has been made to the content since then.

Art transcends time, space, and dimension to stimulate sense of wonder. This is one such example.

Director: Kazumasa Otsuki
Producers: Yoshiyuki Hamano, Naomi Matsuzawa, Tomoko Nagai
Contributors: Jean-Luc Martinez, Yukiko Kamijima, Yutaka Takase, Shinichi Takayama, Osamu Yamada, Tomoko Nagai, Yoshitaka Nakamura, Yuko Okura

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## 27 L'Odyssée de la vie                               2:41

The adventure of the inside life, from conception until the final transformation as a baby.

Director: Niels Tavernier
Producers: Mac Guff, 17 Juin Production, Transparence Productions
Contributors: VFX Director: Philippe Sonrier,
Vincent Wauters
VFX Producer: Laleh Sahrai
Animation: Pascal Anquetil, Herve Pigeon,
Bartelemy Boirot
Lead Lighting: Nicolas Brack
Shading, Rendering: Max Touret,
Emmanuel Prevot
Compositing: Philippe Sonrier, Vincent Wauters
Modeling: Xavier Duval, Benoit Vincent
Music: Caroline Petit

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## 28 ToyShop                                          4:00

"ToyShop" demonstrates state-of-the-art, real-time rendering on consumer graphics cards, such as ATI Radeon X1800. A variety of high-end techniques were designed with the sole purpose of creating an immersive, detail-rich, real-time environment. And while these methods surpass convention, they are implemented efficiently within the current specs of the most cutting-edge, popular videogame engines.

One of these complex techniques is parallax-occlusion mapping, a per-pixel ray tracing algorithm for inverse-displacement mapping with dynamic lighting, soft shadows, self-occlusions, and motion parallax for rendering complex surface details with low polygonal meshes. A novel post-processing rain effect was developed to simulate multiple layers of raindrops with a compositing pass over the rendered scene. The rain illumination is computed by combining water-to-air refraction for individual raindrops, a Fresnel effect, and reflections due to surrounding light sources.

Physics-based particle systems with stretched normal mapped quads generated raindrops falling off objects, complete with the illusion of motion blur. The illumination from the lightning system accurately simulated refraction and reflection of the droplets, adding further realism to the scene. An offline raindrop simulation system was adapted to the GPU to simulate and render water droplets trickling down glass panes in real time.

Hardware: ATI Radeon X1800 Graphics card, Intel Pentium IV 3.4 GHz CPU, 1 GB RAM
Software: ATI Sushi, NormalMapper, CubeMapGen, RenderMonkey; Autodesk Maya; Adobe Photoshop

Directors: Natalya Tatarchuk, David Gosselin, Dan Roeger
Producers: Callan McInally, Lisa Close
Contributors: Lead Programmers: Natalya Tatarchuk, David Gosselin
Programming, Shader Programming: John Isidoro, Dan Ginsburg, Thorsten Scheuermann, Chris Oat
Lead Artist: Dan Roeger
Artists: Daniel Szecket, Abe Wiley, Eli Turner
Previous Programming: Alex Vlachos, Chris Brennan
QA: Paul Cintolo
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## 29 Liquid Simulation on Lattice-Based Tetrahedral Meshes  1:09

This video shows results using a simulation method for animating the behavior of incompressible liquids with complex free surfaces. The region occupied by the liquid is discretized with a boundary-conforming tetrahedral mesh that grades from fine resolution near the surface to coarser resolution on the interior. At each time-step, semi-Lagrangian techniques are used to advect the fluid and its boundary forward, and a new conforming mesh is then constructed over the fluid-occupied region.

The tetrahedral meshes are built using a variation of the body-centered cubic lattice structure that allows octree grading and deviation from the lattice-structure at boundaries. The semi-regular mesh structure can be generated rapidly and allows efficient computation and storage while still conforming well to boundaries and providing a mesh-quality guarantee.

Pressure projection is performed using an algebraic multi-grid method, and a thickening scheme is used to reduce volume loss when fluid features shrink below mesh resolution.

Examples are provided to demonstrate that the resulting method can capture complex liquid motions that include fine detail on the free surfaces without suffering from excessive amounts of volume loss or artificial damping.

Hardware: Pentium IV, 2 GB RAM
Software: Pixie Renderer; Custom liquid simulator

Director/Producer: Nuttapong Chentanez
Contributors: Bryan E. Feldman, Francois Labelle, James F. O'Brien, Jonathan R. Shewchuk
Music: Bjorn Lynne

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## 30 Physics on GPUs  2:06

The current trend in processor technology is to improve efficiency in parallel architectures. To exploit this new computational power, we have to develop data-parallel algorithms. We demonstrate a method that enables us to implement rigid body and fluid simulation entirely on the GPU which is a parallel processor, obtaining unprecedented performance. The method is applicable to other simulations and it also accelerates coupling simulations as shown in this movie.

Director/Producer: Takahiro Harada
Contributors: Seiichi Koshizuka, Yoichiro Kawaguchi

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## 31 Perceptive Pixel Multi-Touch Demo Reel 3:32

This reel showcases our latest research into multi-touch interaction techniques, an exciting area of human-computer interaction that has seen a recent surge of activity from many research groups. Since the introduction of the core sensing technique two years ago at SIGGRAPH 2005, we've been prolifically exploring the wide range of interaction techniques that have become enabled.

Multi-touch inherently implies multi-user, and the scalability of our sensing technique has given us a unique ability to explore larger interaction scenarios, such as walls and tabletops, that can accommodate multiple users working either independently or collaboratively.

Hardware: PC
Software: Custom

Director/Producer: Jefferson Y. Han
Contributor: Philip L. Davidson

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## 32 Jet Production from a Rotating Black Hole :57

NCSA worked with the University of Virginia to visualize a relativistic magnetohydrodynamic simulation of a rapidly rotating black hole surrounded by a magnetized accretion disk.

As the simulation proceeds, a jet forms: a small fraction of the disk's matter is expelled outward along the poles of the disk's rotation. The jet carries a helical magnetic field. A custom scientific data plugin read the original spherical grid simulation data into a Fluid Effects volume. The brightness of the jet region, physically far less dense than the disk, is greatly enhanced in this visualization.

Jets are observed to emerge from the environments of many real black holes into which matter is falling — those left as remnants of massive stars, and the much larger ones at the centers of most galaxies. The process for producing these jets is only partly understood. This simulation represents a realization of one possible mechanism for launching and powering jets. The NCSA visualization group also used these data to produce one of the animations used in the October, 2006 PBS NOVA program, "Monster of the Milky Way".

Hardware: NCSA Linux Visualization Cluster
Software: NCSA data visualization plug-ins

Director: Robert Patterson
Producer: Donna Cox
Contributors: Visualization: Donna Cox, Robert Patterson, Alex Betts, Stuart Levy
Scientific Simulation: John F. Hawley, Julian H. Krolik

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## 33 Solar - Terrestrial Interaction from Cosmic Collisions 2:35

A data visualization from captured solar imagery to solar wind interaction with Earth's magnetosphere. Magnetosphere visualized in 3D from a fluid dynamic model fit to satellite observations concurrent with solar imagery. Volumetric supercomputer rendered element of the Aurora Borealis shown between the heights of the International Space Station and that of airliners. Earth imagery from NASA satellite mosaic.

Software: Pixar RenderMan; Spot star rendering software; Autodesk Maya; Apple Shake; CISM space physics visualization software

Director: Carter Emmart
Producer: Christopher Scollard
Contributors: Executive Producer: Anthony Braun
Lead Technical Director: Mark Bajuk
Scientific Visualization: Erik Wesselak, Ryan Wyatt
Digital Artist: Bill Bourbeau
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## 34 **Flight to the Center of the Milky Way**　　1:37

We start out at the position of our sun, 26,000 light years from the center of the Milky Way Galaxy, where we've embedded the Hipparcos star catalogue data, 118,000 mapped star positions. This particle model is based on a hi-resolution image of another Milky Way like galaxy, m83.

We created particle groups for stars, birthing stars regions, gas, numerous dust lanes and H2 regions. We can control each of these elements separately in the rendering process. There are about 100 particle groups, totaling 57 million particles in the model. The background galaxies are based upon Brent Tully's galaxy catalog, a collection of 36,000 galaxy positions.

We modeled the galactic center elements based upon hi-resolution images from a variety of wavelengths, such as radio, infra-red, optical and x-ray. One of the primary images was the wide field radio atlas image. Astronomers Mark Morris from UCLA and Doug Roberts from Northwestern consulted on the modeling of the galactic center.

A modified version of this animation appears in the Denver Museum of Nature and Sciences "Black Holes: The Other Side of Infinity" digital dome show and "Monster of the Milky Way" PBS/NOVA program.

Hardware: NCSA Linux Visualization Cluster
Software: Star Renderer

Director: Robert Patterson
Producers: Donna Cox, Robert Patterson, Stuart Levy
Contributors: Visualization: Donna Cox, Robert Patterson, Stuart Levy, Thomas Lucas
Science Advisors: Mark Morris, Doug Roberts

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## 35 **Coal Fire Research.**
## **A Sino-German Initiative**　　3:01

Satellites observe our planet day and night, making visible what is unseen to the naked eye, for example the CO2 concentration in the atmosphere. Within the last 200 years the CO2 level has grown by 25%, a major reason for green house effect and global warming.

One source of CO2 hasn't gained much attention yet. All around the world coal fires are burning under the soil, in North America and Australia for centuries, in South Africa, Indonesia or India for decades. The problem is worst in China where more than 100 sites are on fire all the time.

A Sino-German research project with contribution of the German Aerospace Center is working on the detection of coal fires by the help of satellites.

This animation features the problem of CO2 emissions from subsurface coal fires. After an introduction to the CO2 problem, we focus on coal fires in China and explain their ignition, development and effects. In the final part of the animation we describe the detection of coal fires by finding heat patterns in satellite images.

Hardware: PC, Dual Intel XEON 3.0 GHz CPU, 2 GB RAM
Software: Visual Nature Studio; Autodesk 3ds Max, Combustion; Adobe After Effects, Premiere, Photoshop; PCI Geomatica; ESRI ArcView

Director: Nils Sparwasser
Producers: GeoVisualizationCenter, German Remote Sensing Data Center (DFD), German Aerospace Center (DLR)
Contributors: Thorsten Andresen, Christian Gredel, Stephan Reiniger, Robert Meisner

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