SIGGRAPH2004

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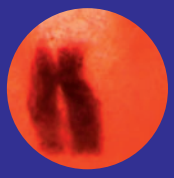
Art and Anima

electronic art and animation catalog

electronic art and animation catalog



Art Gallery page 3
Sue Gollifer
University of Brighton, UK

Computer Animation Festival page 153
Chris Bregler
New York University

Art and Animation

SIGGRAPH 2004 Electronic Art and Animation Catalog

Computer Graphics Annual Conference Series, 2004

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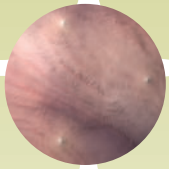
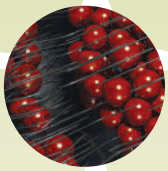
Sue Gollifer
University of Brighton, UK

Art Gallery





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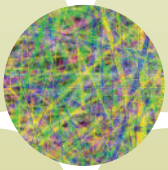

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Thames Valley University

Kathy Rae Huffman
Cornerhouse

Gerfried Stocker
Ars Electronica

Evelyn Wilson
The Hospital Festival

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Ravensbourne College of Design and Communication

George Fiefield
Boston Cyberarts Festival

Midori Kitagawa
The Ohio State University

Ivan Pope
Freelance Artist

Anthony Rowe
squidsoup.org

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University of Plymouth

Colin Beardon
University of Waikato

Patrick Lichty
Intelligent Agent

Bill Hill
Jacksonville University

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Otis College of Art & Design

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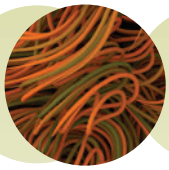

See, Hear, Touch

Art for the Senses

Synaesthesia, the SIGGRAPH 2004 Art Gallery, exhibits work by visionary artists that stimulate the senses. This year, more than 150 art pieces encourage the viewers to see, hear, and touch the art. These include 2D, 3D, interactive works, installations, multimedia, telecommunications, computer animation, screen- and sound-based work.

This year's theme, Synaesthesia, demonstrates how artists can excite the senses using technology. The techniques involved range from low-tech digital plotters to high-end computer graphics and animation. It also features work from both well-established and younger contemporary artists. The works all seek to question our notions of perception and creativity.

In addition to the works of art, the SIGGRAPH 2004 Art Gallery also presents six critical papers and round-table discussions around the theme of Synaesthesia. The presenters are internationally renowned theorists and artists whose work is being displayed in the gallery.

The prestigious Ars Electronica 2003 (Linz, Austria) have chosen the SIGGRAPH 2004 Art Gallery to celebrate 25 years of their existence by presenting a chronicle of their history. The Gallery also includes the work of artists who were prize-winners and exhibitors at Ars Electronica in 2003. It is a truly international show, with artists from around the globe.

The SIGGRAPH 2004 Art Gallery also collaborated with the Computer Animation Festival, Emerging Technologies, Sketches, and Web Graphics to give artists a wider forum to speak and exhibit their work.

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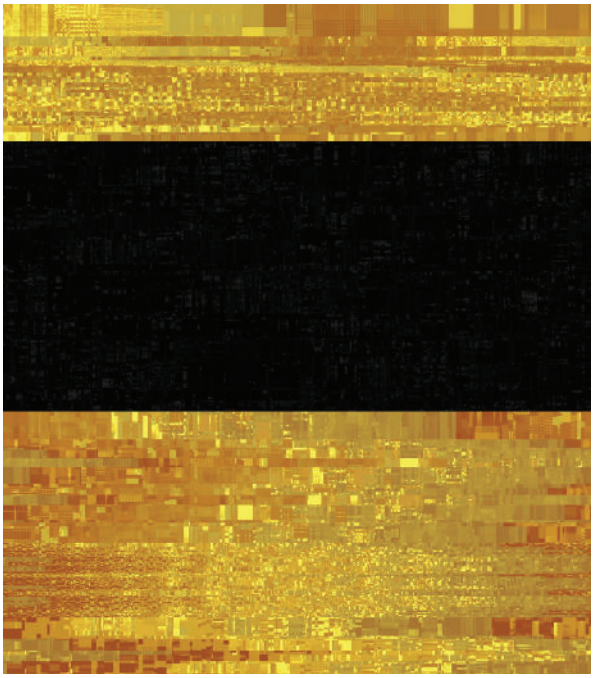

j604
1400 x 1600 pixels
Digital art

ARTIST STATEMENT
For me, art is a release of mind and spirit, a freedom that allows self-discovery. Where the rational and the spiritual mix, there is revelation, and my creativity makes great leaps.

The colors and textures of impressionism, the compositions and structures of cubism, and the energy of Pollock's action paintings, as well as the rhythms of modern music, all influence my work. Music is constant company as I create.

When I begin a piece, I have selfish goals. I want to find myself, to understand more of my mind and soul, and to express that discovery in my work. As I connect with my work, my goals expand to include a desire to provoke reaction and thought.

TECHNICAL STATEMENT
I begin with a photograph or a simple painting for texture and digitally manipulate it to create complex compositions in which texture, color, and space are my primary concerns. Laying down vertical and horizontal guidelines, I use the rectangle marqee to select areas to modify with simple filters. As I work, I will modify the color, brightness, and contrast. This piece was created from a digital photograph taken with an Olympus digital camera and then manipulated on a Macintosh G3 with Photoshop.

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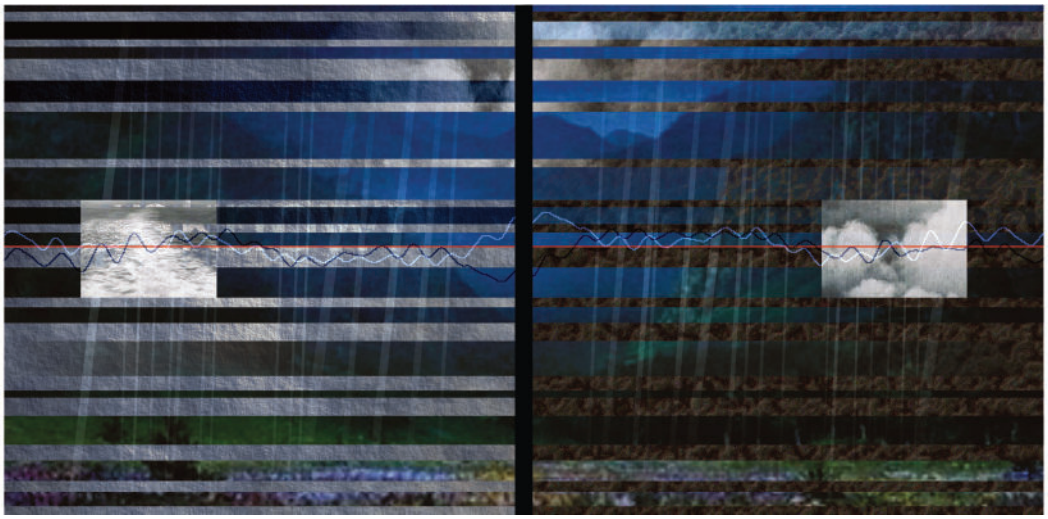

Voice
30 inches x 54 inches
Digital print

ARTIST STATEMENT
Voice is simply about the reflexive nature of language seen through echo and reverberation.

Computer-generated surface patterns are interspersed with photographs and a sound-wave form. These visual interpretations of experience are augmented by an audio element that plays with details of sound and silence as well as movement. In a sense, the sound is meant to give a longer duration to the reading of the image. Conversely, the sound is divided by silences, creating a tension to the duration.

In *Voice*, I have aimed to explore some of the ideas expressed by psychologist Paul Fitts in the following quote, where he points out the different temporalities of sight and hearing:

Each sense modality has certain inherent advantages and disadvantages for the detection and analysis of different kinds of information. Audition is more nearly a continuous sense than vision; vision is basically selective and intermittent. As a consequence, audition is well adapted for the detection of warning stimuli that may arise at any moment from one of a variety of sources, whereas vision is well suited to the selection of and concentration on particular stimuli to the exclusion of others.

Paul Fitts, Engineering Psychology and Equipment Design, in Handbook of Experimental Psychology, New York and London: John Wiley & Sons, Inc., 1951

TECHNICAL STATEMENT
Several of the series of digital prints I have made over the past eight years have been designed for different kinds of output, as this is one of the possibilities inherent to the computer as a creative medium. *Voice* has two versions, one for lightboxes (duratrans) and another as two photographic prints. Both versions have an audio element for CD player and headphones.

The sound element of this piece is based on a recording of birdsong that was taken apart using various sound-editing programmes. Essentially, the material was deconstructed and magnified so that the single voice became an orchestra of tones, sliding scales, and percussive sounds. Other sounds were generated from the computer to include artifacts of the process (the voice of the medium).

The images were constructed in a drawing programme and contain digitally generated sections/layers as well as imported photographic images, text, drawn objects and imported sound-programme graphics. These elements are layered as interactive transparencies and constructed into divided sections, creating an image that aims to be both continuous and discontinuous.

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Steffi Beckhaus

Eyes in Motion I
60 centimeters x
40 centimeters
Photographic paper

ARTIST STATEMENT
Even though we observe our static surroundings as being still, the visual information we perceive is highly dynamic. Unless we are physically fixed to the world, our body, and with this also our sensory systems, is constantly in motion. Small changes in our eye positions (saccadic eye motion) or larger motion (head or full-body motion) help form a 3D image of our world. Despite this motion, we perceive fixed points in the environment as static. Our brain takes information from the sensory systems, integrates it over time, and forms an image or representation of the world around us. And, in our desire for a predictable environment, we then experience the moon as a static benchmark and the horizon as stable, even though the image in front of our eyes moves frantically.

But what does the unfiltered information received by our eyes look like? And how would we perceive this information if it were presented as such? To explore this, an image of a scene was taken over a period of time and with the eye (the camera) in motion. This image shows a church in Bonn-Beuel at 4 am. The camera, representing the eye in motion, is moved while taking the picture. In the resulting image, the outline of the building is blurred. At the same time, the atmosphere, the silence and tranquility of this early morning moment, appears in the image and becomes its major focus. Compared to traditional pictures, less pictorial information but strong atmospheric information is captured in this photograph. This integrated view on our environment might be one of the many possible views further processed by our brain, potentially even contributing to the generation of emotions.

TECHNICAL STATEMENT
This work was recorded by a digital camera (Canon 10D) and slightly color modified (Photoshop). Except for those modifications, it is the original image as recorded by the hand-held camera over a period of ~2s.

Derek Besant

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Body of Water
5 feet x 5 feet hung on pins
Thermal ink on vinyl mesh unframed

ARTIST STATEMENT
If we humans are made up of 98 percent water, then what comprises the other two percent? A similar question could be asked in the current debate on the influence of the digital world on our definition and the identity of our non-virtual world.

My subjects are immersed in particular aquatic environs and are given instructions to consider themselves more like a land mass within a body of water. I ask them to consider themselves not so much as who they are, but what they might be as shorelines, tides, shallows, depths, currents, undertows, and corrosions. I shoot several digital photos of each subject, then file that raw information away for a year. When I finally return to the file, I have enough distance to be more objective as I build the psychological portrait of the subject as water. My works become images that reflect personality traits of the subject; centered, disturbed, serene, clear, scattered, distorted etc.

I remove anything that distracts from the water image (jewelry, birthmarks, unwanted surface disturbance) and reconstruct the image as a translation of digital information.

I use industrial digital-output equipment from the billboard industry because advances in the kind of work I build are more available there than the fine arts. These images are thermal ink laminated on a vinyl-mesh screen, and, in certain light, they have surface properties similar to a solarized photo image. The scale allows viewers to wander into the dot matrix and digital field, and find their way out again.

TECHNICAL STATEMENT
I reworked the digital photo sources in Photoshop and desaturate the color to black and white. I digitally recorded the vocal patterns of Isobella Couperthwaite Kreizel reading every definition of “water” from my 1973 Funk & Wagnalls University Edition Dictionary.
I also gathered digital water sources as audio tracks from my June 2003 artist’s residency at Palazzo Venier/Casa Artom Study + Research Centre in Venice. Collaborating with Paul Connolly (Fluor International’s Computer Data Team Leader in South Africa); we’ve rebuilt both sound-source wavelengths into one soundtrack using PEAK and PROTOOLS.

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Alain Bittler

MOVEMENT3
24 inches x 32 inches
3D-generated pictures
printed on photo paper

ARTIST STATEMENT

For me, 3D programs are a means to experiment. I build universes composed of industrial materials that can be altered or degraded. In those worlds, every being or object is generated from these materials.

Sceneries and objects are modeled as mesh sculptures generated in the computer. These assemblies of points and polygons are later clad with textures. The next step in the conception is choosing the lighting sources: either spotlights or luminescent surfaces. Finally, a picture is taken with a virtual camera. This picture is entirely generated “in silico.” The computer becomes a camera able to take photos of objects devoid of physical reality. The virtual lens captures a moving virtual world, which allows it to take time-lapse shots to create new objects. Indeed, one can record the movement of an object in a given timeframe, and the combination of these positions generates a new virtual 3D object, which can in turn have its own movement and trajectory. In the footsteps of futurists, I pursue my studies in a domain close to abstraction, in territory opened by new technologies. The synthetic images I generate are parametered mathematically and can be modified according to duration. Far from these constraints, I try to convey a journey, a self study, a poetic vision, or a form of spirituality.

I draw my inspiration from cinematographic sources, like Fritz Lang's “Metropolis” and the masterpieces of Miyasaki, celebrated for his poetic visions. I am also inspired by fashion designers’ creations such as Issey Miyake's sculptural garments.

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Alain Bittler

MOVEMENT4
24 inches x 32 inches
3D-generated pictures
printed on photo paper

TECHNICAL STATEMENT
I use traditional 3D programs to create my pictures, and there are no post-process effects after the rendering of the 3D programs.

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Steven Bleicher

Texola
(Route 66 Series)
11 inches x 14 inches
Digital image with graphite
and mixed media

ARTIST STATEMENT

The underlying theme of my body of work is Americana. Currently, I'm using the subject matter of great old highways such as Route 66 and the Dixie Highway as a point of departure. So much of American life continues to revolve around our mobility, highways, and their effect on our lives. These themes are essential to my work.

The central images in these works are a continuation from earlier work. They are a combination of graphite and digital elements, starting with photographs or sketches from the selected landscape or site. I then couple these images with maps and souvenirs or mementos from the local area. While many of the items have a kitsch quality to them, they are not meant to have a condescending tone, but are really celebrations of our uniquely American zeal for collecting and bringing back souvenirs from our travels and vacations. The items directly relate to the images and maps, adding additional components or layers of meaning to the work. The souvenir elements augment the images, giving a more complete sense of place. In addition, they provide an editorial or narrative component to the work and are also another means for viewers to engage the work. The pieces are displayed in shadowbox frames that are large enough to hold both the two- and three-dimensional elements in a confined and unified space.

My work is about the persistence of memory. It is about our human need to capture and preserve a space in time, a fleeting moment. After any event, all that remains is the memory.

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Steven Bleicher

Relics of the Past
(Route 66 Series)
11 inches x 14 inches
Digital image with graphite
and mixed media

TECHNICAL STATEMENT
My work starts out with a digital photograph, which is transferred to my desktop computer. I work on the image in Photoshop, first adjusting the levels to create an even tonal range. I then add or subtract parts of the image as needed to develop the formal elements and composition. After I feel I have taken the image as far as I can in Photoshop, I rotate the image, flipping it horizontally to create a mirror image of the work. It's then printed on a laser printer. The print is transferred to hot pressed watercolor paper using toluene. This is very dangerous and requires a carbon filter mask. I then work into the transferred image with graphite, redrawing and adjusting the values. The final step is the addition of the 3D element. It is framed in a specially constructed shadowbox frame.

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Marc Böhlen/Jt Rinker

ARTIST STATEMENT
The Universal Whistling Machine (UWM) is an installation that ponders the phenomenon of whistling as a universal mode of communication, common to digital machines, humans, and many animals. It senses the presence of living, moving creatures in its vicinity and attracts them with a signature whistle. Given a response whistle, UWM counters with its own composition, based on a time-frequency analysis of the original.

UWM is an inquiry into automation of an underexposed area of low-bandwidth expression, whistling; direct and immediate; code and content in one. Whistling is admiration, secret code, and protest. Emmet Till, a young man of color, was lynched in 1955 after "wolf-whistling" in the presence of a white woman. Intuitively understood, whistling is transcultural communication below the radar of social etiquette.

So much can be expressed by minute alterations of airflow in the mouth. Tongue, throat, lips, and cheeks funnel air into a pressured cocktail of sound energies we use to argue, debate, and sing. But the richness of human language has proven exceedingly difficult to analyze and synthesize, and spoken languages with large vocabularies and multiple speakers still defy the very best speech-recognition systems. A humble machine, UWM deals with a subset of the language problem.

Whistling is a communication primitive in most human languages. It is a kind of time travel to a less-articulated state. Inhabitants of Gomera, one of the Canary Islands, use a whistling language, el Silbo Gomera, to communicate from hilltop to hilltop. Their high-power whistles carry farther than the spoken word. We share whistling and song with many animals. Mammals and birds also carry the means for whistling. Just as we carry physical remnants of our bodily evolution in us, we carry the capacity for whistling also.

UWM is a statement of affection for the machine, but it is also a critique of the directions we have embarked on. The grand goals of artificial intelligence remain elusive. Maybe we can find peace with machines on more subtle levels.

Details are available at: www.buffalo.edu/~mrbohlen/uwm.html

TECHNICAL STATEMENT
UWM is programmed in C++ and PD (pure data) under a win32 operating system. It runs on PCs with ieee1394 and audio inputs. People passing by are sensed via a low cost, FireWire-enabled CCD camera/sensor. Sound capture occurs through a noise-reducing microphone array and a standard audio card. Signal sampling occurs at 44.1 kHz. UWM recognizes when people are approaching, invites them to whistle, analyzes the response, and reacts in kind when appropriate.

The Universal Whistling Machine
11 inches x 8 inches x 9 inches
Machine vision and audio signal processing

UWM's whistle synthesizer is based on the basic spectral characteristics of a human whistle. Most human whistles exhibit a fundamental frequency with very few harmonics (often only one or two) as well as a band of high-frequency noise. UWM's own whistle is created through a process of subtractive synthesis. UWM uses noise as a signal generator for the whistle synthesizer. The noise is passed through a pair of filters in series. The first is a one-pole, high-pass filter with a roll- off frequency of 600 Hz. The second filter is a band-pass filter, which passes a sinusoid at a specified center frequency and attenuates all other frequencies. The center frequency is the pitch for the whistle, and the "Q" (quality factor or bandwidth) of the filter is set proportional to the center frequency.

Whistle resynthesis and transformation occur in response to input. The data captured from the pitch tracker are used to mimic or transform the input whistle in order to initiate a dialog with a person. Raw data collected by the pitch tracker is smoothed out by high-threshold gates on pitch and low-threshold gates on amplitude data.

UWM is capable of several transformations. An up-transposition or down-transformation is created by adding a fixed pitch interval to the pitch data. This results in a response whistle that is either higher or lower than the input whistle. Contours of the input whistle can also be mapped and increased, decreased or inverted to give a semblance of the whistle with varied pitch transformations. Time transformations are created by making the data-reading rate different than the data-capture rate. This creates responses that are slower or faster but independent of pitch and amplitude. Tempo rubato can be imitated by randomly changing, within a given range, the time interval between each index of the pitch and amplitude arrays, thus speeding up some portions of the response whistle while slowing down other portions.

Keith Brown

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geo_04
35 centimeters x 38 centimeters x 40 centimeters
Rapid Prototype LOM

ARTIST STATEMENT

The possibilities for computer-generated sculpture are obviously immense. As the computer gradually takes its place in the tool chest of the contemporary practitioner, we are inevitably seeing changes that challenge our traditional views and preconceptions about how sculpture is conceived, produced, and experienced. The computer and related technologies, for many, including myself, have become much more than simply a new set of design and production tools. They have presented us with completely new media to explore, and no doubt there will be many more to follow. If there is one single influence that will separate the art of this millennium from that of the past, and constitute a paradigm shift of aesthetic and conceptual advancement, of equivalent cultural significance to the first "hand paintings" made in the caves of Paleolithic man, then my calculated guess is that it's going to be, if it is not already, computer technology.

TECHNICAL STATEMENT

geo_04 was designed in 3ds max and output via the LOM technique. Using the computer, in a direct way, as the medium, my work is conceived while interacting with the cyber-modeling environment.

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Shoal_01
10.25 inches x 8 inches x 7.75 inches
Rapid Prototype FDM (ABS) Plastic

ARTIST STATEMENT
My work embraces a wide range of digital activities, both virtual and actual. My main concern is with "real virtuality" or "cyberealism" rather than "virtual reality," reversing the order between the cyber and the real. These works present sculptural forms and images that could otherwise not be realized except in the digital and cyber environments, thus producing a new order of object, which is made physically manifest in 2D and 3D media.

TECHNICAL STATEMENT
Shoal_01 was designed in 3ds max and output via a Stratasys FDM device using Waterworks. This work presents sculptural form that could otherwise not be realized except in the digital and cyber environments, thus producing a new order of object, which is made physically manifest in 3D media.

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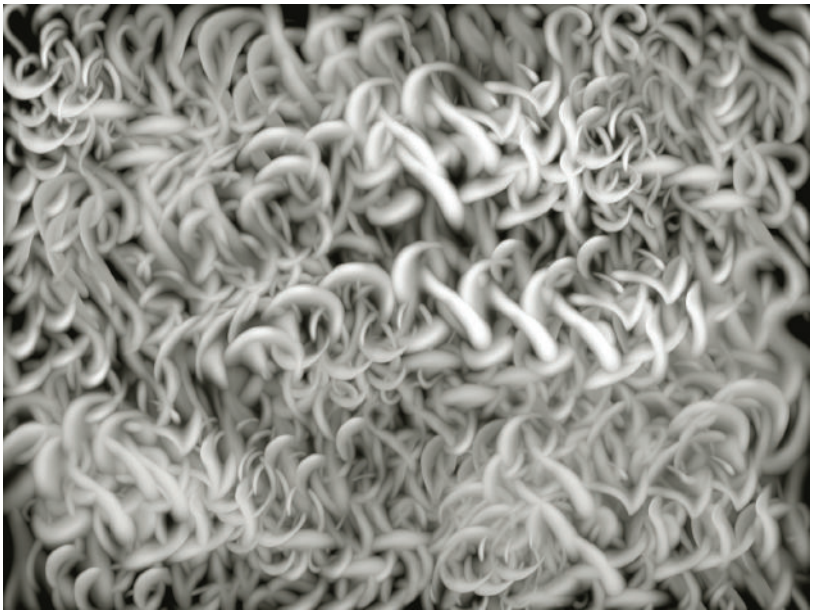

Tortuosity #37
48 inches x 36 inches
Epson ink jet and acrylic
on paper, over masonite

ARTIST STATEMENT
The Tortuosity series (two early pieces were shown in the SIGGRAPH 99 Art Gallery: technOasis) continues to evolve in new and intriguing ways. I am always interested in finding new ways to depict visions of structured chaos, and the tangled web of flowing and ebbing forms in my recent Tortuosity paintings brings this to a new level. The forms twist and turn in and out of themselves, engulfing the viewer with a combination of rhythmic visual dynamics and elements akin to riffs in a jazz improvisation.

TECHNICAL STATEMENT
Tortuosity digital paintings are created on Macintosh computers, entirely in Adobe Photoshop. Individual units, which I call "Elementals," are hand drawn on a Wacom graphics tablet. The act of painting Elementals is meditative, and the act of combining them revelatory. Combining many Elementals using various layering techniques builds up the image complexity in ways only the computer can accomplish. Finally, the imagery is printed on an Epson ink jet printer, then collaged onto the final display surface.

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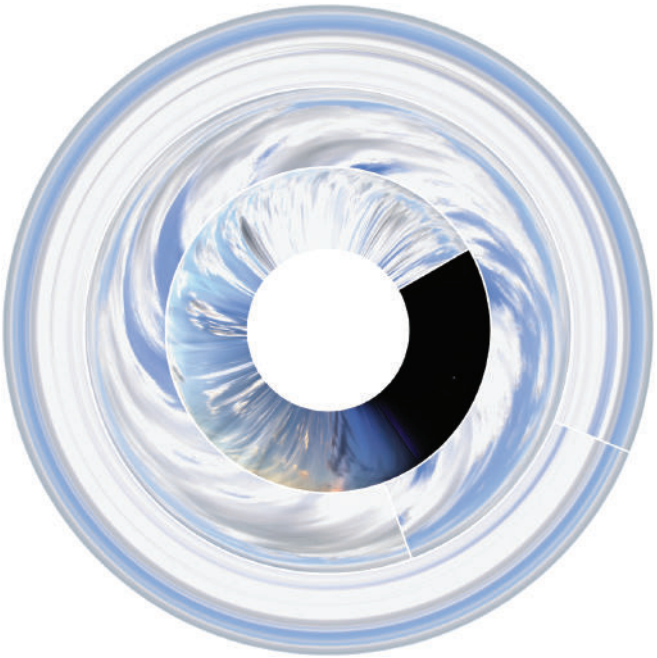

The "Last" clock: 14:25:18 pm, South Kensington
1 meter x 1 meter
Digital print

ARTIST STATEMENT

The "Last" clock is a record of the passage of time. It is like a familiar analogue clock. It has a second hand, a minute hand, and an hour hand. The major difference to a regular clock is that the hands of *the "Last" clock* are made from a slice of live video feed, and as they are rotated round the face of the clock, they leave a trace of what has been happening in front of the camera. The hands are arranged as concentric circles, the outermost being seconds, the middle one minutes, and the innermost hours. Thus, at any moment in time, the clock face displays the last minute, last hour and last 12 hours as it's history. The video feed can be any live video source: A camera mounted on the clock itself looks at what is happening in front of it, and a signal from a remote camera is streamed over the internet, or a TV signal is fed directly to the clock. The clock can thus display local space, remote space, or media space respectively.

Though the print captures from "Last" are taken at a specific moment, they show not just the moment, but also the past. They capture the rhythm of a space. The other benefit of the prints from "Last" is that they typically offer a resolution of over 5,000 x 5,000 pixels, so one can study the captured passage of time in far greater detail than on screen.

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Greg Daville

Trying to Thinking
42 centimeters x 59.4 centimeters
Digitally manipulated photographic print

ARTIST STATEMENT
Trying to Thinking is one of an ongoing series of digitally manipulated photographic prints called Rescued Items from Babel.

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Greg Daville

Estate
42 centimeters x 59.4 centimeters
Digitally manipulated photographic print

ARTIST STATEMENT

Estate is one of an ongoing series of digitally manipulated photographic prints called Rescued Items from Babel. The figure is employed in staged environments in order to explore the failings and aspirations of visual, verbal, and written communication, particularly in relation to the thought process and the creative act. In this particular image, urban architecture, bureaucracy, and the homogenous ambience of the office environment provide the theme. The images form a group of self-portraits that use visual states of collapse as a metaphor for the human condition, particularly with regard to aspiration, planning, and even self-sabotage. Each piece includes one or more figures posed with a variety of props: artist's notebooks and miniature ladders have been used thus far. The recorded constructions made from the human form and props are further developed into impossible structures through photo manipulation. This work forms part of a larger cross-media proposal called Abbauhaus, the main theme of which looks at collapse as a state of resolution.

Further information and downloadable pdf documents are available at: www.site-to-be-destroyed.co.uk

TECHNICAL STATEMENT

I have been using digital technology in my work for some years now, working with Director, Flash, Dreamweaver, animated gifs, and Final Cut Pro. The main software I use is Photoshop, which I employ when making digitally manipulated or constructed images. In the past, (just as I did when I used to make traditional collages with paper), I would appropriate found images as source material. In *Rescued Items from Babel*, I photograph the pieces myself. Each "set" is individually researched and constructed. It usually takes a number of different photographs taken from the set to acquire all the necessary information to make the final image. I use an Olympus Camedia (5 million pixel) camera and shoot at the highest available quality setting, which in this case is Tiff. The high-resolution photographs are imported into Photoshop, layered, coloured, and collaged. With this particular series, I am interested in attaining an almost painterly quality in the ambience and light, and realising images that do not look obviously digitally manipulated. Post-production work is carried out closely with the printer, usually making a number of test runs before the highest quality is realised. Using video, Director and Final Cut Pro, I plan to develop some of these images into interactive plasma screen presentations.

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Kreise_7.3sc
60 centimeters x 50 centimeters
Plotter drawing, gel-pen on paper

ARTIST STATEMENT
My artistic interest is centering on the adventures arising from the difficulties in mastering the plotted line as a means of artistic expression. Three fascinating aspects contribute to my interest:

1. The fascination of the mechanically guided pen.
2. The fascination of the monochrome line.
3. The fascination of the generative code.

The technology of mechanical drawing is almost extinct. It has been supplanted by other print technologies in the course of technological development. As a metaphor, the moving pen in the grip of a plotter in action resembles relatively closely the process of the hand engaged in drawing. Interesting consequences of artistic concern arise from this observation. Historically, drawings have been around since the beginning of art, and drawing is an enormously rich domain of art. It is a universe, indeed, that is complemented by the equally rich universe of machine-generated drawings, also a universe in its own right.

It is a big artistic challenge to work in this universe, to invent strategies and code them into programs from which drawings can be generated that possess identity and uniqueness and that demonstrate with great clarity that they belong to the machine universe. Artistic quality is living comfortably in both universes.

One of the limitations of plotter drawings, which also can be regarded as a strength, is the monochrome line produced by a pen, a pencil, or the like. There is a substantial difference between a printed and a drawn line, and my drawings exploit this difference.

One of the specific properties of machine-generated drawings is their reliance on a generative code. The program is the instrument by which the idea and the intentions of the artist are transformed into the drawing. The conceptual work necessary long before a line is actually drawn creates a distance between idea and output. Design of a generative set of rules must precede the actual production process. This leaves room for a vast space of possible approaches, which I have barely scratched with my efforts.

TECHNICAL STATEMENT
The image is one of a series, using very small elements in very large arrays. It is constructing a contradiction, because it defines and draws “pixels” with lines. The plane of pixels is actually a drawing, with each pixel being a very small circular or randomly shaped “potato,” an individual instance, a closed line with a unique position in the plane. A minimalist generator was programmed to write HPGL code, which is used to realize the image on a pen plotter. The mechanical shortcomings of the fast-moving pen generate slight desirable deviations, which result in an overall gray scale. Random processes are used to disturb the strictly orthogonal arrangement. In nature, we find many situations where small elements are assembled in large arrays. The image is regarded as “synaesthetic” because it attempts a synergistic junction of contradicting and mutually exclusive concepts, which jointly form a new concept. There is no meaning to the drawing, but associations are triggered, which may connect the image to known and familiar patterns. These associations can also be connected to a synaesthetic function, bringing different views together into mental concepts.

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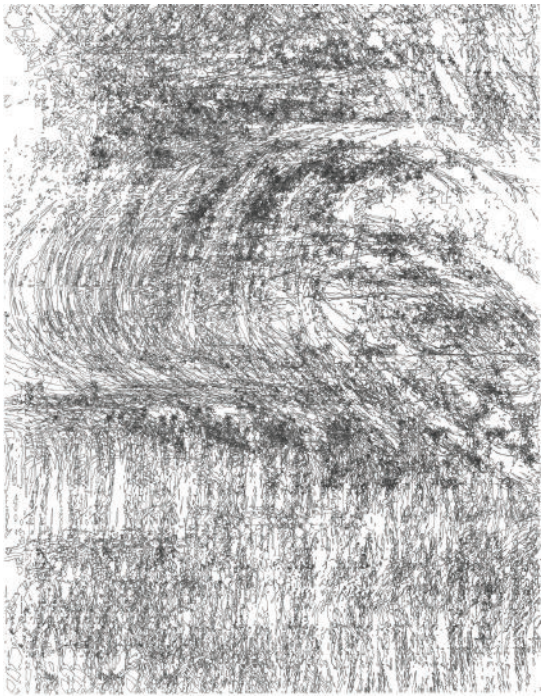

SD_1084-1
50 centimeters x 60 centimeters
Plotter drawing, gel pen on paper

TECHNICAL STATEMENT
Starting with a photograph of the bark of a tree, an image from nature is transformed over and over again. It is a bag of data, which is hitchhiking along a chain of processes, getting a lift from many readily available programs and changing in every one of these steps. The result is not an intentionally designed image but a drawing, which is declared finished after an arbitrary sequence of transformations. The goal is not to arrive in some preconceived location but to travel and find something. The emphasis is on finding, catching, grabbing as opposed to deliberate or algorithmic generation. After each step, the system decides whether to trigger another transformation with totally uncertain outcome. I see the idea of “synaesthesia” in this process of transformations. Each one represents a concept that is imprinted onto the image. The image is accumulating and absorbing all these changes and mutates into something new. But the artist decides if it is allowed to survive.

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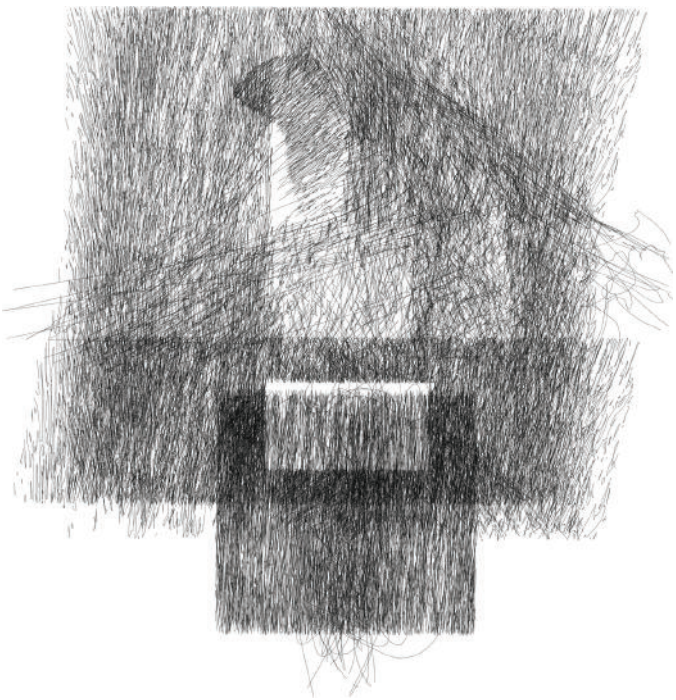

the_bird_facing_left
50 centimeters x 60 centimeters
Plotter drawing, gel pen on paper

TECHNICAL STATEMENT
This image is realized as a pen drawing on a pen plotter. Structures and patterns found in nature are transformed into line patterns. They are combined with algorithmically generated drawings and arranged in a collage-like fashion. Fuzzy clipping is applied, which generates unsharp, fuzzy boundaries along clipped lines and areas. A vaguely recognizable animal figure, *the_bird_facing_left* is used to give hints at an interpretation, if one chooses to look for one. The drawing is identifiable as a program-based machine drawing because it uses a line type that is difficult (or impossible) to realize by hand, and it uses this line type with great consistency.

The work is consistent with the SIGGRAPH 2004 Art Gallery theme, synaesthesia, because it draws on the vagueness and fuzziness of the clipping processes. They open a space for interpretations and associations from different sources. They construct a twilight or shadow concept, avoiding a clear message, and thus hold potential for bringing together different emotions.

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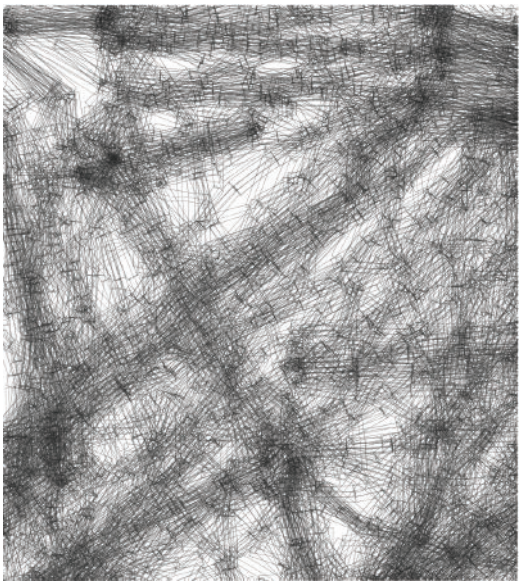

ohne_Titel
50 centimeters x 60 centimeters
Plotter drawing, pencil on paper

TECHNICAL STATEMENT
A massive arrangement of polygons composed of parallel junks is arranged on the plane. The drawing is a pen-plotter image plotted with pencil on paper. The image is generated using random procedures within certain boundaries and observing some parametric restrictions. The program accepts a set of starting points for polylines and generates the lines agorithmically on the basis of parameter settings. The drawing comes into existence in a single shot and as one instance of a possibly endless sequence of drawings. All the required decisions are coded in the program. The intentions of the artist are formulated before the process is triggered.

I regard this type of drawing as a species of the universe of machine-generated drawings with specific characteristics. The plotted line is different from the printed line, and that contrast becomes important in the areas where lines intersect. The concept of algorithmically generated drawings is a unique concept that raises many interesting questions within the idea of synaesthesia.

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Plays Well with Others
60-inch diameter globe
on a 25-inch stand with
projector and computer

ARTIST STATEMENT

Plays Well with Others is a collaboration in which a team of artists, educators, game designers, programmers, scientists, theorists, and social activists explore the unique dynamics of spherical-globe projection.

I brought the group together to engage in a dialog with ARC Science Simulations after seeing the OmniGlobe at ACM SIGGRAPH 2003 Emerging Technologies. Our program for the OmniGlobe, v.1.0 was part of my art exhibition, Daria Dorosh: Plays Well with Others, shown at A.I.R. Gallery in New York City in April 2004. The exhibition gave us the opportunity to see our work projected in the globe for the first time. We created an audio/visual program for the globe that reflected our personal and professional interests. Working individually and collaboratively, some of the shared themes that emerged were culture, identity, location, pattern, re-use, and play. The exploration continues as we test new capabilities provided by ARC Science and continue pushing the boundaries of our experience with the OmniGlobe.

The content creators and collaborators are ARC Science, Galen Brandt, Kate Brehm, Clilly Castiglia, Steve DiPaola, Daria Dorosh, Carter Emmart, Ian Epps, Kevin Feeley, Mary Flanagan, Harriet Mayor Fulbright, Lizbeth Goodman, Gayil Nalls, Jeremi Sudol, and Camille Utterback. Viewers can access the work from a touch screen or by using a track ball. The spherical projection choreographs the viewer to be an active participant by choosing a vantage point for seeing the work. The interaction is serious fun, a game of chance and choice. The curved screen changes everything, both for us as content creators and for the viewers. The medium of the OmniGlobe demands that we experience and articulate our work from a different perspective. It raises some interesting questions: How does creating content for a sphere change the creator's experience of organizing space? Conversely, how does designing for a flat rectilinear pictorial space affect our perception of the world? In *Plays Well with Others*, we have stepped across the boundaries of our disciplines and professional roles into digital territory where definitions of space, scale, location, shape, authorship, art, design, and communication are, at best, blurred.

TECHNICAL STATEMENT

The OmniGlobe is a large spherical, rear-projection screen illuminated internally by a digital projector in its supporting base. This spherical computer display can be used interactively for presenting global data in its natural geometry or any content that lends itself to viewing "in the round." It is a true 360-degree display system.

How It Works

The projector image is focused up from the base onto an internal dispersing mirror high in the screen. This convex element spreads the geometrically corrected image over the surface of the spherical screen, which is then visible on the external surface. ARC Science has received a patent for this display concept. Images for the OmniGlobe are mapped into a special geometry for spherical projection. On a flat monitor, these images appear as a circular "super fish-eye" view, with the point that will be at the bottom of the spherical screen at the center and the pixels around the outer edge squeezed toward the screen top.

OmniGlobe Content

Originally conceived for Earth-related themes, spherical projection offers many other interesting visualization possibilities. Unlike conventional projection, whether on flat or concave screens, what is seen depends on one's position. This provides an opportunity for user interaction, and a personal vantage point within the real 3D space of the globe. To view our surroundings on the surface of a spherical screen is to view the world inside out. It translates surprisingly well. Content for the OmniGlobe can be rectangular image "maps" representing 360 degrees around the globe and 180 degrees from the bottom to the top. ARC software can correctly "wrap" such images on the screen fast enough to produce the illusion of smooth rotation and user track-ball navigation. Alternately, pre-rendered movies can be created using standard 2D or 3D software along with ARC authoring software.

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Anna Dumitriu

X and Y (number 5)
16 inches x 20 inches with frame
Digitally enhanced photograph

ARTIST STATEMENT
For a long time, my work has been concerned with the subject of immortality. I am trying to develop an understanding of the scientific background of the subject, from HeLa Cells to genetic engineering and various other forms of therapy used to prolong life. I have created a large body of work based on Vitamin C molecules, human-cell biology, and DNA.

I created a series of drawings and watercolours in the Genetics Department of St. Georges Hospital in London while looking at cells through a microscope. In particular, I looked at chromosomes. These experiences led me to create a series of digitally enhanced, “mocked-up” photographs of X and Y chromosomes. Some of the images appear frozen, which is a reference to cryonincs, the method of freezing the dead with the hope of re-animating them in the future when medical science has evolved.

TECHNICAL STATEMENT
I used a canon digital camera to take the original image, which was then transferred to my Macintosh G4 computer. Then, using Adobe Photoshop 7, I adjusted levels and enhanced the image.

The final image was professionally printed on photo glossy paper.

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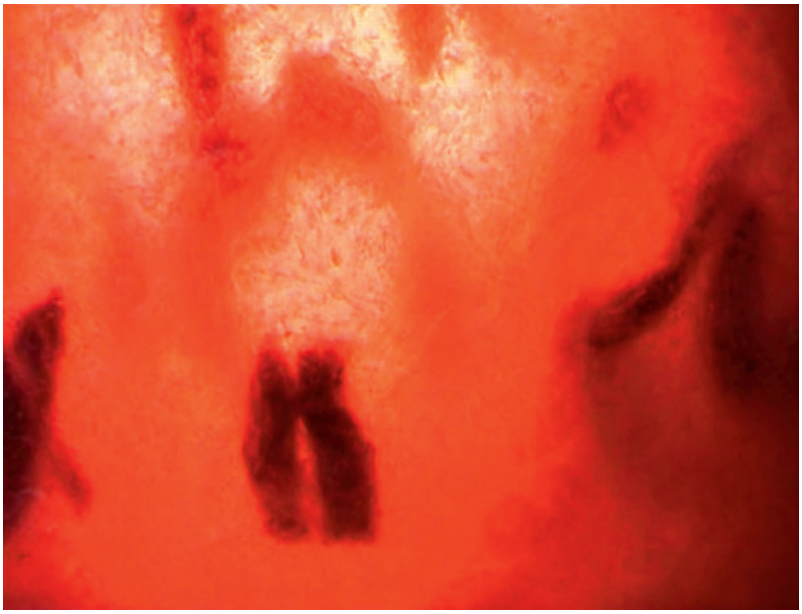

X and Y (number 2)
16 inches x 20 inches
Digitally enhanced photograph

TECHNICAL STATEMENT
I used a Sony PC4E digital video camera to take the original still image, which was then transferred to my Macintosh G4 computer. Then, using Adobe Photoshop 7, I adjusted levels and enhanced the image, using gaussian blur, unsharp mask, and replace colour.

The final image was professionally printed on photo glossy paper.

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Broadway One
41 inches x 25 inches
x 5 inches
Plasma Display

ARTIST STATEMENT

When we watch a film, we accept music as a natural part of the work. More generally, the sound track is recognised as a crucial element in the quality of the film in its total sense. However, at times the music is thought of as an accompaniment to the visual element, whereas it might alternatively be thought of as having equal weight and importance. By far the most interesting integration, however, is where the music and the visual element are equal so that, for example, one can see a visual display as one instrument in which other instruments, such as violins, happen to produce sound. The composition of such work can begin either with the music or the visual or swap between them. Alternatively, it might begin from some more abstract description or notation that can be mapped into either sound or image.

The idea of integrating sound and vision in art goes back at least to the early 1700s, when Louis-Bertrand Caste created "Colour Organ." Many have been inspired by Baudelaire's poem "Correspondence," in which he speaks of "... Perfumes and colours, answerable sounds ... Joining to form a deep, mysterious whole ..." There is considerable interest in this integration today. The advent of the computer has enhanced the possibilities in this area enormously, for two key reasons:

1. Its ability to control the real-time production of sound and image with considerable flexibility and speed.
2. The computer is basically a symbol manipulation machine, so it is able to take a symbolic form (such as a score that is a symbolic representation of music) and automatically work with it by, for example, transforming it according to a rule.

In this work, the idea is to operate with structures that can mediate between sound and vision, to produce a unified work that integrates both. Thus a single unified abstract structure is mapped into sound and image to produce the integrated "synaesthesic" work.

TECHNICAL STATEMENT

The work is displayed on a wall-mounted plasma screen, with sound relayed over a small pair of audio monitors or headphones. It is a generative piece that is written using Max/MSP/Jitter software running on a Macintosh computer. This is a graphic programming environment for sound, image, and interaction, which provides an ideal system for exploring the correspondence between sound and image. In this work, which is part of a series, the artists and programmers use predefined colors that are specified as RGB values and two-dimensional bars specified as co-ordinates. These correspond to synthetic sounds that occupy temporal rather than spatial positions.

The software consists of several discreet processes. These are grouped together into three sections: pattern generation, image display, and audio output. Of these, the second and third are intended to be reusable, and they simply wait for instructions from the pattern-generating system. The image display section waits for a list of two integers. The first integer relates to a position, and the second a color. The audio output waits for the same two integers but treats the first as a position in time not space, and the second as sound.

Given this flexibility, several different pattern-generating modules can be written to explore the outcome of different algorithmic processes. In this case, an algorithm generates a list of eight numbers, each element of which counts from zero to three. These elements are connected in series, so that as one element reaches the maximum value, the next one counts up one. The outcome of this is a series of absolutely linked color bars and a shifting musical pattern.

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What if it happened here?
31.25 inches X 22.25 inches
Ink jet prints of Photoshop images combined with text in InDesign

ARTIST STATEMENT

There are two types of witnesses: one who has direct experience, and another who chooses to stand and witness, to remember and remind others. Although I do not always feel comfortable with the concept of "bearing witness" because of its religious overtones and the response it evokes in others, as a book artist I see my current books as intimate witnesses, testimonies of history and human behavior. I have focused on issues of war and genocide since 1999 and have attempted to explore different methods of presenting information to the reader to initiate a personal examination of what has happened, what may happen, and the responsibility to confront injustice, no matter where it occurs. Although we have many examples of how history has taught us nothing, it is my hope to present history in such a way so it does teach something. In *What if it happened here?* I have manipulated personal and family photographs to remind the reader that not too long ago, the West virtually ignored the plight of Yugoslavians as their country became embroiled in nationalistic conflicts. The United Nations, Europe, and the United States failed to confront the problems of ethnic cleansing, the g-word (genocide), the conflict of a foreign policy of self-interest vs. a major humanitarian crisis. How many must die before action is taken? Why is timing everything? Who should we believe? I rarely create work to be framed, and so I have translated what could be a book into a series of framed two-page spreads housed in hinged double picture frames, just like the ones we put on our desks and mantles. Although these are "massaged" images, some of the originals have been presented in such frames. Some of the images would never be presented in such an intimate manner, but perhaps they should be, to keep us sensitized to the problem. To maintain a connection between my work and the book format, these picture frames can be left open or closed to remove the uncomfortable material from one's sight. This nine-spread series is a sampling of what is a larger text.

TECHNICAL STATEMENT

Image editing software and scanners have destroyed the veracity of photographs as historical evidence. History can be altered, exaggerated, fictionalized. With the digital tools of Adobe Photoshop, InDesign, a Mac G3 and G4, a UMAX scanner, a Mavica digital camera, and an Epson C82 printer, I have created the "Balkanization" of the United States, complete with evidence of war crimes. Digital photographs from my own house fire in March 2003 have been combined with scans of black-and-white and color photographs, NATO photos, and artwork in Photoshop that is merged with text in InDesign. In this series, I am Croatian, Bosnian Muslim, Serb, ethnic Albanian. I am the victim and the perpetrator. I want to make you believe I have lived in a war zone.

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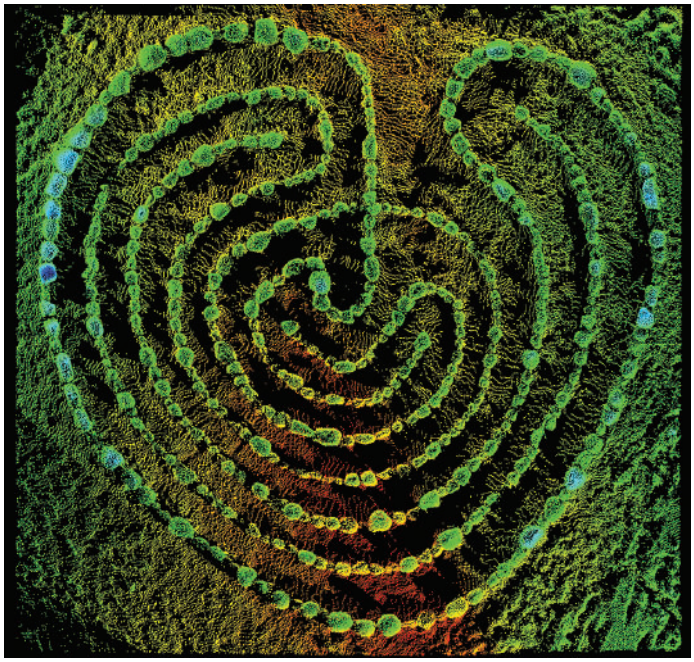

The Labyrinth
2 meters x 2 meters

ARTIST STATEMENT
The Labyrinth: The body as technological measuring instrument

Historically, the connection between the earth and our bodies and souls was of natural everyday use. It was carried out in religion and reinforced by law. Before building a house in Sweden, you were to hire a "slagruteman" to detect the right place in relation to the "Curry lines." With the help of dowsing rods, the owner's body was used as an instrument to detect the universal grid system.

In Sweden, we have about 300 labyrinths, the highest incidence of labyrinths in the whole world. Yes, they do exist in many other countries as well and are built according to the same geometrical patterns and placed in relation to the energy lines. Our labyrinths are said to be an expression of an ancient fertility cult, a tradition that has survived in Sweden to the present day; a young woman stands in the center, and a young man tries to free her.

I placed my labyrinth out in the snow, and the earth energy lines were detected traditionally, with dowsing rods. The stone labyrinth was then digitized with a 3D laser scanner and exported to Maya and Photoshop in my computer, where I edited and printed it out, to share it with you. Walking the labyrinth, you can find answers to all your questions, even the meaning of life. This work uses the latest technology to get in touch with the oldest knowledge and bring us to inner peace, truth, and love.

The Labyrinth is the result of a two-year collaboration among the artist, the GIS-institutet and the Creative Media Lab at the University of Gävle.

TEAM
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Mikael Östlund, computer engineer, GIS Institute, University of Gävle
Åke Lindberg, engineer, GIS Institute, University of Gävle
Stefan Seipel, Professor, Computer Graphics, CML/Department of Computer Science, University of Gävle

TECHNICAL STATEMENT
The labyrinth was physically placed out in the snow, laser scanned with a 3D laser scanner from three directions (Leica HDS2500), imported into Maya, and printed.

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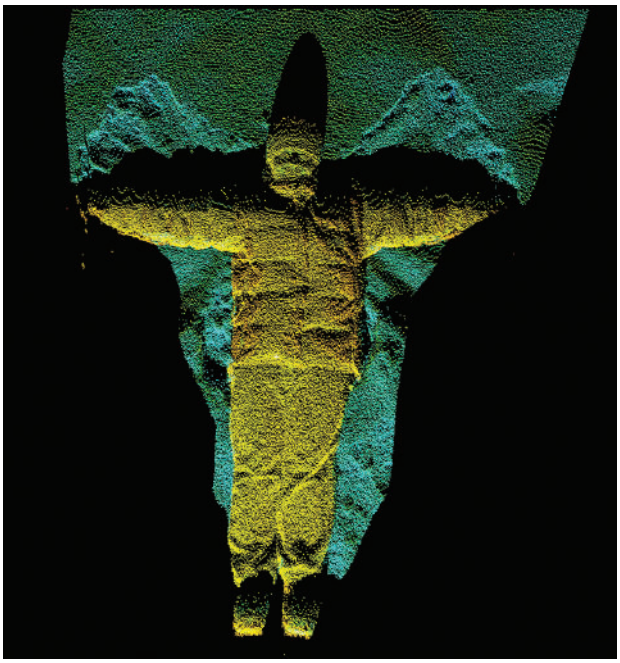

Holy Cow - The Labyrinth, the Woman & the Goddess
2 meters x 2 meters

ARTIST STATEMENT
In our early days, Mother Earth was our goddess. Through rituals in the holy labyrinth, we could walk the path to her, to inner truth, fertility, and happiness. In Sweden we have ~300 labyrinths. Our country has the highest incidence of labyrinths in the world. They do exist in many other countries as well, and the Indians of America used the same figures before Columbus discovered them.

In our modern times, we have forgotten the link to our divine selves and Mother Nature. Our bodies, plants, and animals are devalued to physical objects. With new nano technology and new ideals, we are designing our bodies, buildings, and animals to better suit our needs. The body is styled, buildings are designed by the latest trends, and new cloning and breeding methods redefine animals and plants. The form of a house and of an animal comes as a result of man-made art and technology. Life itself turned into an artifact.

Do we reshape ourselves and our environment on the basis of total knowledge? Do we possess a true sense of the inner values of these inner qualities? Is there more in life than we can see or measure by modern technology? Is there even a lost technology that could put us on the right track again?

With the help of the latest technology, I want to build a bridge to our lost paradise. The door to Mother Earth, inner peace, and love is still open if we want to find it. The knowledge is hidden within the design of the holy labyrinth.

TECHNICAL STATEMENT
The 3D laser scanner team scanned my body out in the snow, with a Leica HDS2500. The digital material was registered with Cyclone and exported to Maya and Photoshop, from where the image was printed out.

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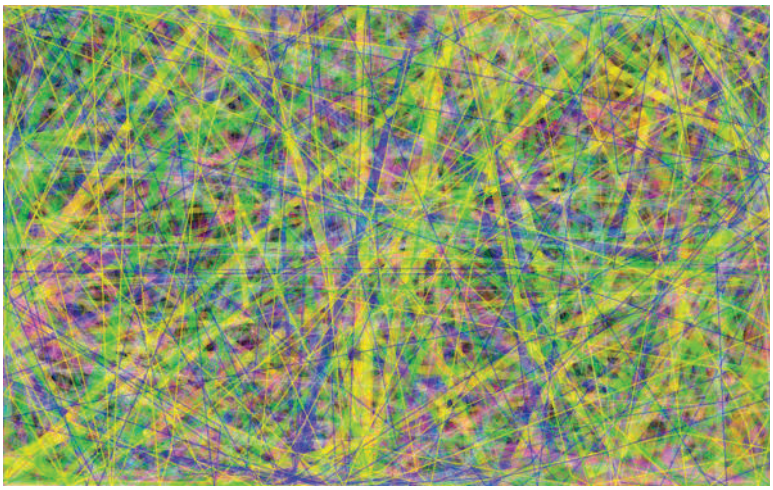

[ineffable]
8 feet x 8 feet
Audio

ARTIST STATEMENT

We use text so frequently in digital communication, but we seldom stop to consider "voice" within our correspondences. As artists, we are concerned with the way computer technology permeates our everyday lives, and how our everyday lives are in turn shaped by the technologies we use. Words, phrases, and sentences represent a time, a person, a map of interpersonal experiences (the external world) as well as the way users relate to the context of digital communication, and to their own computers. Do we have a particular "voice" in our daily writing to friends and colleagues, and does that voice change depending on who we are writing to and why? This project maps the geography of these relationships with sound.

[ineffable] is an audio installation that engages with email messages and maps the use of language through the words people use in everyday correspondence. The work "reads" a pair of correspondents' email archives and analyzes the words therein, grouping them based on the recipient, date, and sound signature of the words, paragraphs, sentences, and finally, the email itself. *[ineffable]* functions as an experimental system that considers the "sound in the head" while reading and writing as a synaesthetic experience.

Two networked computers run the application and create distinct sound maps. The user chooses an email recipient group and/or a date range to donate to the system for analysis. Participants might also send messages to the system's email address for shorter analysis, though these would be less accurate because the data pool would be much smaller. The program takes the words of the subset of the user's email messages and analyzes them as described above and then creates an appropriate rhyme and scan scheme based on a totality of the sound signatures.

In the end, through voice synthesis, the program reads aloud the words now reorganized into a new email message from the *[ineffable]* engine. The idea is to produce a voice for the computer's experience of the data. These new compositions can also be sent to the user who donated the material for reading or further sending into the recursive engine. In this way, the artists propose that the emergent reader/writer *[ineffable]* offers us a way to map the multimodal experience of correspondence through sonification.

TECHNICAL STATEMENT

We used Java to scan the email correspondence and load it into a MySQL database, parsing words to phoneme units using the Carnegie Mellon phoneme dictionary. The data (words) are organized by sender, receiver, date, and larger sets of sender and receiver group mails.

We map the frequency of words used and the placement of a word in sentence, and create a set of words as they are positioned within sentences and paragraphs. The techniques recursively create a "sound signature," a unique number of definitive length for an arbitrary group of words, based on pronunciation, accent, length of sound, etc.

Phonemes map to multitimbral sounds and sounds created by the interrelationships of phonemes and their particular statistical placement among a group of emails. This algorithm turns a set of correspondence into a kind of "other language" using English sounds. Some participants find the work musical, and others find it linguistic.

Fred Fleisher

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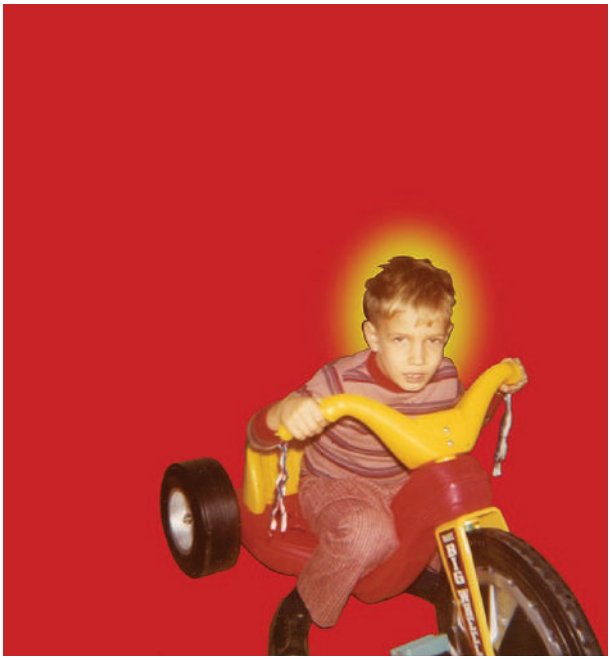

Golden Child #3
30 inches x 40 inches
Digital print

ARTIST STATEMENT
I was born in a small steel town in Pennsylvania. At 17, I enlisted in the US Army and became an Airborne Ranger. I often feel that part of my youth and innocence was lost at that moment. While the decision to leave was mine to make, I was completely unaware of the ramifications.

By using old photographs, toys, and found objects, I'm able to reclaim, or even re-define, that lost innocence. I manifest my ideas in a variety of ways, including photography and digital manipulation, installation, sculpture, drawing, and video.

Current work includes the Golden Child series, where I'm re-writing my own personal history to create a mythological aura around the child I once was, and photographing combinations of toys and found objects that create a familiar, yet uncanny moment.

TECHNICAL STATEMENT
By scanning old photos and using Photoshop, I replace the backgrounds with punched-up, saintly, religious art colors. I also add a quasi-halo in certain places. By using these techniques, I'm able to create the myth of the Golden Child. This project is ongoing, and video will be included in future work.

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Decline & Fall
12 feet x 3 feet
Sand, gravel, water, beakers, halogen lights, plastic sheeting, MIDI, softVNS, video camera, microphones, speakers, mixer, amplifier

"One's mind and the earth are in a constant state of erosion,
mental rivers wear away abstract banks,
brain waves undermine cliffs of thought,
ideas decompose into stones of unknowing."

- Robert Smithson

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Poetics of Migration #1
70 centimeters x 180 centimeters
Metallic laser ctype print

ARTIST STATEMENT

Poetics of Migration is derived from a theoretical framework based around the notion of the porous coastline. This metaphor was seen to act like a film plane in a camera, but a film plane that is operating in slow-motion image capture, recording evidence of what has passed by, sponge-like, absorbing and documenting the record of past histories and then displaying them within the landscape.

The landscape was established as a recorder of a history. It was, in a way, the antithesis to the nature of photography, of photography's instant method of recording the ephemeral moment – that decisive moment. The decisive moment was abandoned for the slow-motion sedimentary accumulation, disintegration, and rearticulation into the tidal fossil records, which made up the evidence within the documentation of the site. The ephemeral moment became tattooed into the rock instead of an inscription on paper. The instant became handmade.

Here in this metaphorical space, the coastal aperture is seen as a porous membrane that fluctuates, and mediates incoming and outgoing ideas and influences as powerfully and as irrepressibly as the coastal tide. The porous coastal plane is seen to be a time traveller. It sits still. Our human-scaled idea of passing may be called time, but time, in this space, stays where it is. We are the ones who pass by. It is the landscape that records us.

The space is an antipodean space where, instead of the land becoming the subject of the document, the land documents us. *Poetics of Migration* then attempts to excavate palimpsest like a document from this archaeological meditation, adding layers to translation, adding complexity and richness to language and culture.

Poetics of Migration address parallel concerns of contemporary image making but also the cultural geo-political hegemony of our time. In response to these concerns, *Poetics of Migration* attempts to understand movements in other cultures and civilisations and tries to understand them in their own terms, in relation to their own histories, their own traditions and inspirations.

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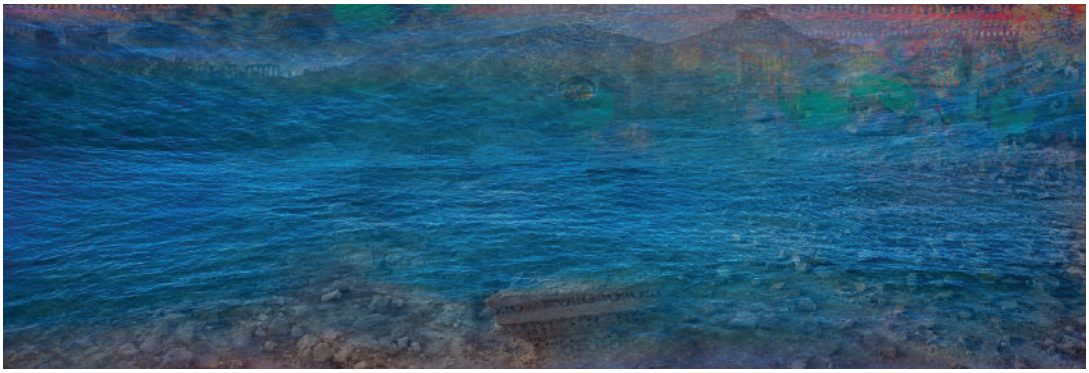

Poetics of Migration #2
70 centimeters x 180 centimeters
Metallic laser ctype print

TECHNICAL STATEMENT
The *Poetics of Migration* images are composites made up of layer upon layer of images collected from around the world over the past 13 years. For example, the images titled *Poetics of Migration # 2* include imagery from Bondi Beach, Sydney; Beijing; and Palmyra, southeast Syria.

The images were scanned at very high resolution and electronically processed into a final 2D artwork.

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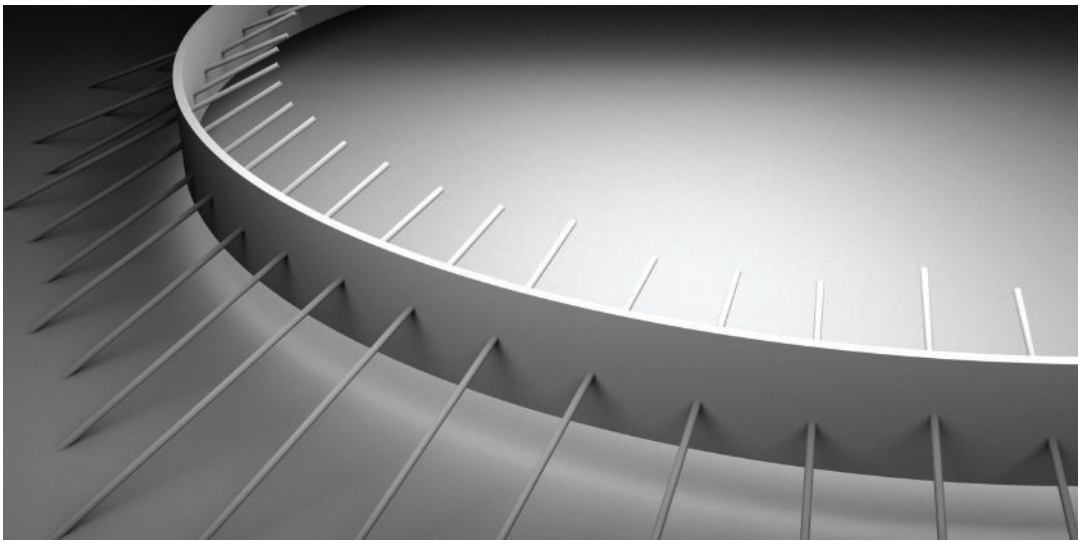

seri_B_A1
26 inches x 15 inches
Archival inkjet - 1 of 10 limited edition print

ARTIST STATEMENT

While growing up in Vancouver's West End during the 1960s, my neighborhood of two- and three-story wood frame houses was being torn down and replaced by high-rise concrete apartment buildings. I loved it. To me, it was as if whole city blocks were being transformed into massive sculpture installations, with each piece soaring hundreds of feet high.

By the late 70s and early 80s most of my personal work consisted of pen-and-ink and color-wash drawings of complex geometric compositions. I always viewed these pieces as frozen moments in time when moving geometric elements had coincidently come together to form a dynamic interaction. Although it was labor intensive and extremely time consuming, I used this technique in 1980, while attending the Nova Scotia College of Art and Design, to create a rather successful animated short film titled, appropriately, "Perspectives."

In 1981, I was introduced to serious computer graphics and animation through Jerry Barenholtz's GRAX software running on Evans & Sutherland computer systems at Simon Fraser University. From that moment, I was obsessed with computer graphics and the potential of creating images and animations using computers. Attending my first SIGGRAPH conference in 1982 strongly reinforced that obsession.

I had already received first-half funding from the Canada Council for my next hand-drawn animated film, but I ended up spending all the money on a PC so I could immerse myself in graphics programming. This led to a two year collaboration in improvised music and live computer-animated performances with Canadian musician/composer John S. Gray at Toronto and Halifax art galleries and performance spaces. It also led to 22 years of full-time commercial CG work at Vertigo Computer Imagery, Omnibus Computer Graphics, and finally my own New York commercial CG facility, AFCG, Inc.

My current personal work echoes those pen-and-ink compositions of the late 70s and early 80s. I consider a piece complete when elements have been combined to form a dynamic composition that not only continues to move on the page, but also recalls those early feelings of immersion within massive, neighborhood filling, concrete sculptural pieces.

The process of creating a successful image calls for an extensive exploration of composition and lighting arrangements, and tends to be almost wholly intuitive. Having worked with 3D graphics software for almost 24 years, the physical process of working with computers has become comfortably transparent.

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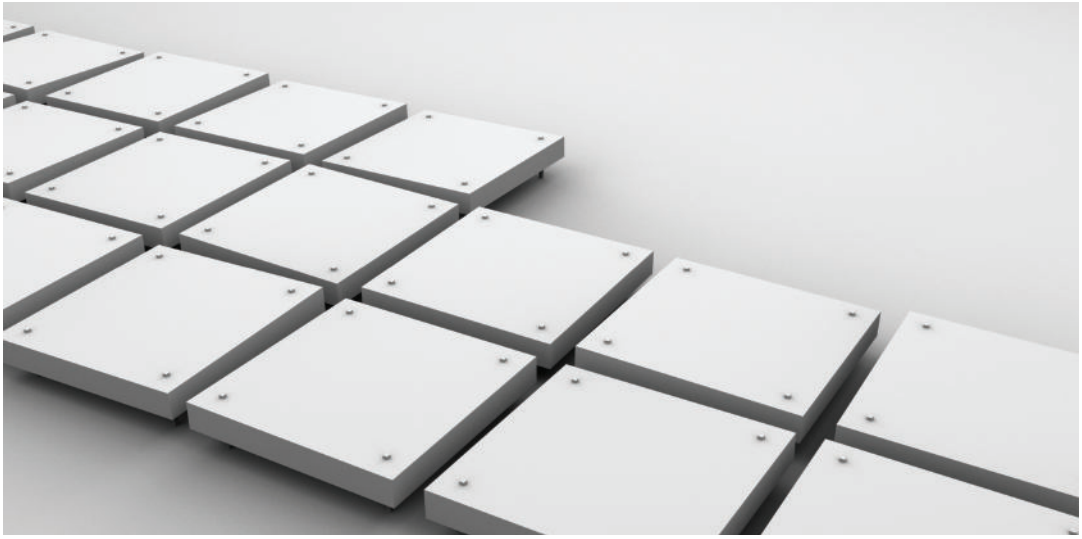

seri_A_G1
26 inches x 15 inches
Archival inkjet - 1 of 10 limited edition print

TECHNICAL STATEMENT
The 3D models, scene composition, lighting, and shading elements for this image were created with the Houdini software package from Side Effects Software.

The scene was rendered with Houdini's MANTRA renderer using "radiant," a pseudo-radiosity shader written by "anonymous" and posted on the OdForce.net web site.

The final image was output as a tiff file at a resolution of 4096 x 2048.

The hardware used to compose and render the final image was a Dell Precision 340 running the Red Hat Linux operating system.

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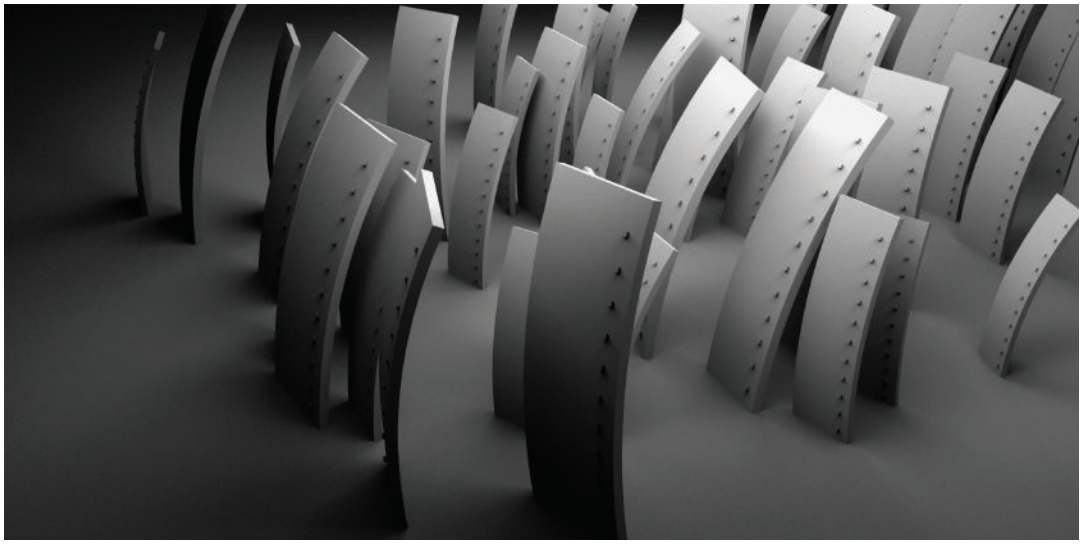

seri_C_D1
26 inches x 15 inches
Archival inkjet - 1 of 10 limited edition print

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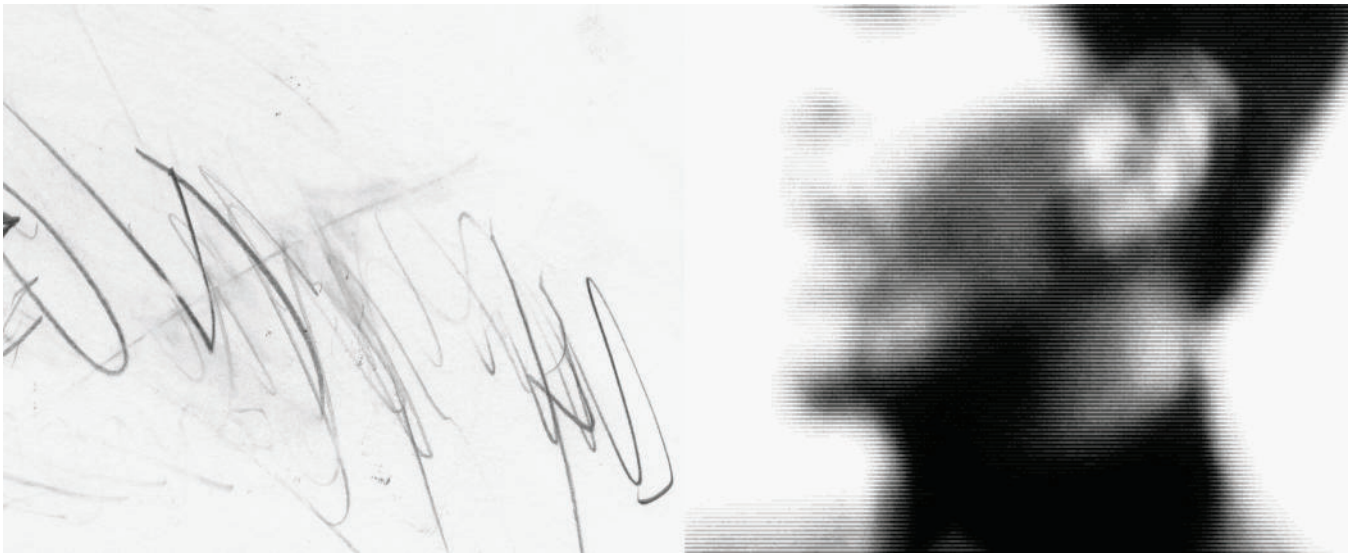

Word Power
80 centimeters x 196 centimeters

ARTIST STATEMENT
Word, intention, will, action, power.
Some instinctive, primary human speech stops the flood of reality.
It's Art.
Sometimes people say NO: political and artistic action.
Work of art: ideogram: explosion of meanings.

TECHNICAL STATEMENT
I try to reduce the sophisticated action of technology so we can see the primary and basic traces of the work. In this case, pencil drawing and scanner + digital video capture; extremely rudimentary digitalisation.

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Quintin Gonzalez

Dusk of Shattered Icons
32 inches x 42 Inches
Digital Print

ARTIST STATEMENT

"It was curious to think that the sky was the same for everybody, in Eurasia or Eastasia as well as here. And the people under the sky were also very much the same - everywhere, all over the world, hundreds or thousands of millions of people just like this, people ignorant of one another's existence, held apart by walls of hatred and lies, and yet almost exactly the same - people who had never learned to think but were storing up in their hearts and bellies and muscles the power that would one day overturn the world."

-George Orwell, 1984

Metamorphosis of identity is the topic I have chosen to speak of through these works. This series of portraits delves into the ever-changing and ever-evolving face of the human condition. What one deems as individual identity is not so much a fixed thing, but rather it is that which animates the day to day experiences of life. The triumphs, failures, hopes, and struggles of existence find their fervid expressions in those countless facades of profound inner change. These many guises loom as foreboding dramatic vignettes that have been blurred into a single transfixed moment that simultaneously signifies the passing of time. Yet it is in the pondering of days past that the tethers of an uncertain fate become lifted, allowing a true face to be revealed as an unveiled meaning. This revealed intent captures that ephemeral design growing as an emerging catalyst for the many guises of transformation. These works touch upon those facades that are donned in an age of oppressive struggle and are somber witnesses to an era when individual reformation ultimately functions as an act of assimilation and self-preservation.

Uniformity becomes a forlorn and final means to shield that internal essence of the sacred at the center of one's core being. It is the inner self and spirit that remains most dear as an untouched unique voice. In time, this faint utterance becomes a resounding roar for those moments when men and women look defiantly into a black tempest of persecution, prejudice, and brutality and walk that blighted path toward a destiny of compassion, dignity and hope.

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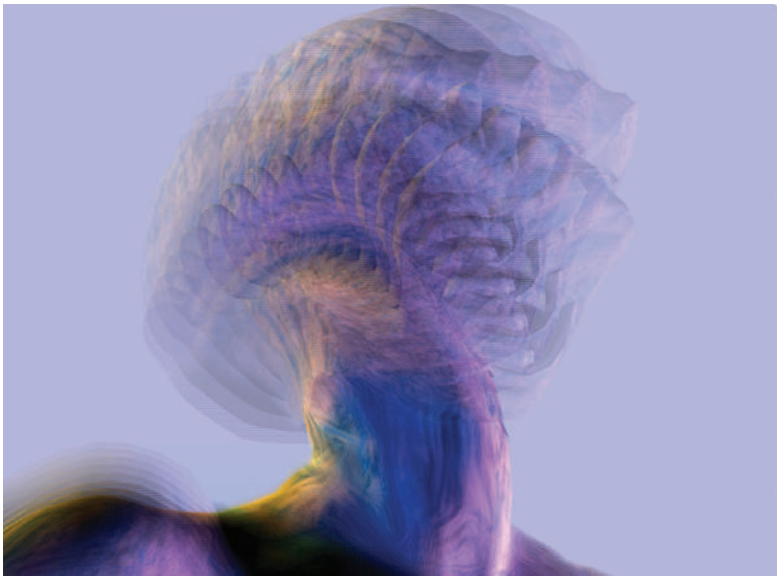

The Mist of Spider City
32 inches x 42 inches
Digital print

TECHNICAL STATEMENT

These works incorporate an extensive use of Curious Labs Poser 4, Corel Painter 8, and Adobe Photoshop 7. In my work, manipulation of formal issues and use of digital imaging software are completely intertwined. This studio practice allows for imagery that utilizes digital media to execute the most complex visual structure I can create. This technical description outlines both the design and methodology of my work.

I begin by developing my portraits in Curious Labs Poser 4 based on a vague visual idea of what I might wish to convey. At this point the figure, is in its most basic state, and the primary choices about color, shape, line, and composition are made. I then advance to create a more complex manipulation of the form and design of my concept. At this point, the image is converted to a tiff file and opened in Corel Painter 8. This process is best described as pushing from the general toward the specific. The aspects of this working method are inexact and come from a series of trials and errors. However, this method of working and reworking carries my work to a realization of clarity and precision. The awkward beginning of accidents in my image development is crucial because this forms the structure and foundation of a finalized piece.

Also, as the appearance of what I wish to convey evolves, the true form and intent of the image emerges. After a series of daunting in-studio defeats, a decisive stage of image development may take place. I then open the work in Adobe Photoshop 7, where now I am ready to form the conclusion of a particular work. This comes about as a process of making all the elements of the image unclouded. There is a point in my work when I strive for a kind of visual eloquence. Here, I endeavor to create the most visually lucid composition I can possibly make. This is a moment in my work when the last emphatic concept is chosen and depicted. It comes about through rigor and experimentation and it is the point in my work when I have nothing more to add.

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Gene Greger

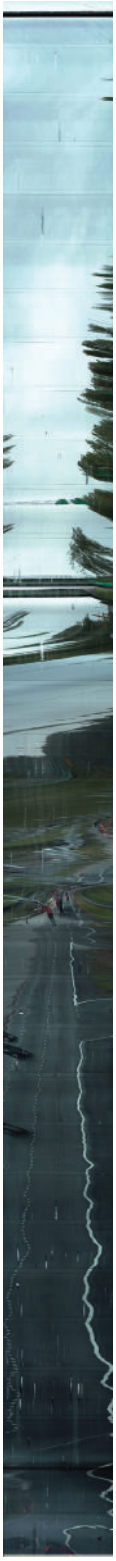
ARTIST STATEMENT
When people are driving, they spend most of their time focused on the road in front of them. Occasionally, circumstances allow or dictate viewing of scenery or road signs, forcing drivers to change perspective momentarily. As a section of road is traveled repeatedly, such as in the case of a daily commute, more pieces of the surrounding environment fall into place, forming a more complete mental landscape of the totality of the surroundings.

With this artwork, I put forth a perceptual view of my commute as an amalgam of previous travels along the same route.

TECHNICAL STATEMENT
This image was created from frames taken from a video of my daily commute from Troy to Albany, New York. Frames from the video were stacked together to form a 3D “lattice” with each lattice point corresponding to a pixel in a particular frame.

Visual data contained within the lattice were projected on a cutting plane that ran diagonally through the lattice, forming the resulting image. Each row of the image represents a constant time value in the video sequence, with the top of the image corresponding to the first frame and the bottom row the last.

Each row was also taken from a different horizontal scanline of each video frame. The top row of the image was taken from the topmost row of the first frame of video, the second row from the second highest scanline of the second video frame, and so forth.



Commute
6 inches x 70 inches
LightJet print

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Solar Self Portrait
14 inches x 18 inches
C-Print

ARTIST STATEMENT
I create machines that respond to and record physical forces within the natural environment. Specific mechanical devices are directly controlled by the movements and energies that they were designed to respond to, at a chosen site. The machines function to visually document the selected natural activity, continuously, over a period of time. The documentation, which is usually designed to be displayed in the form of a continuous line, is made to be seen entirely at once, to immediately reveal its complete history and progression to the viewer.

In presenting these linear records, it is my goal that my machines achieve a relative and true representation of the specific activity and energy that they were designed to respond to. I consider that visual line to be more engaging than the device used to create it and to be more noticeable than the force of its origin. It is my hope that through this process of collecting and presenting a force's history as a perceivable line, I can stimulate a genuine appreciation for the natural forces that created them, and the energy they possess.

TECHNICAL STATEMENT
In *Solar Self-Portrait*, a micro-controller (Parallax Basic Stamp 2) uses a computer program to detect the light of the sun and control the drive motors on the stylus. The light-sensitive components are simply photo resistors, which are mounted on the very top of the stylus. When used in conjunction with .1uf capacitors in a "resistor-capacitor circuit," the micro-controller collects a numerical value of light intensity on each sensor.

As the stylus moves along the ground, the contour of my shadow must stay in between the light sensors. That means that one must stay in direct sunlight, and the other must remain in my shadow. When these conditions are satisfied, both drive motors on the stylus turn forward, allowing it to move in a straightforward path. When the stylus strays from its course, the photo resistors detect a change in lightness, and the micro-controller reverses the direction of the corresponding drive motor, to bring the stylus back on course.

A 200 RPM geared motor (12 VDC) continuously turns within the chalk funnel to distribute the chalk to the ground. The drive motors are 2 RPM, 12 VDC . A remote-control circuit, independent of the micro-controller, allows me to switch the stylus on and off easily from a fixed position nearby during the initial calibration phase of the piece. The drive motors, chalk motor, and micro-controller can all be switched off independently.

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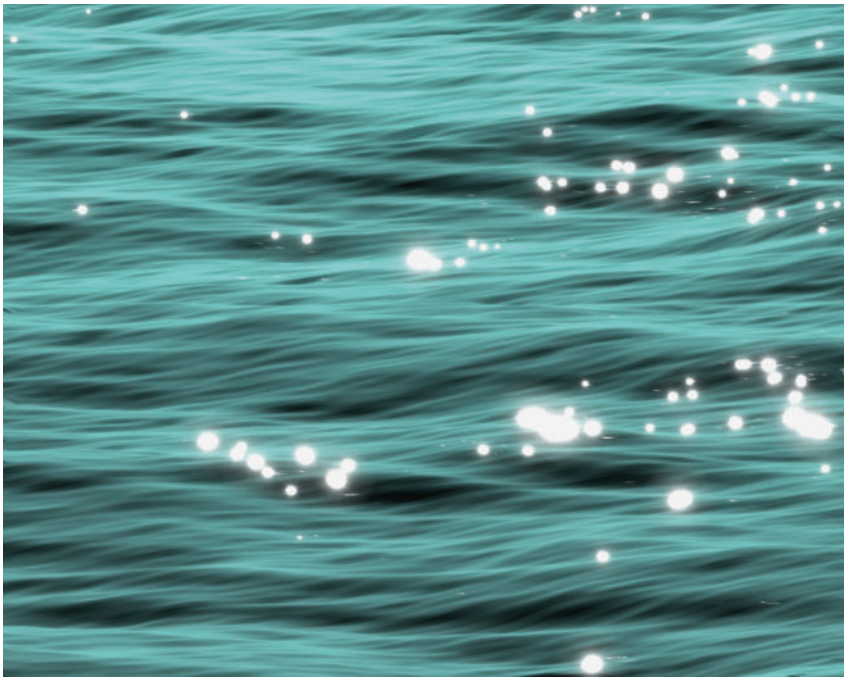

Sparkle Sea
32 inches x 28 inches
Computer animation

ARTIST STATEMENT
These works are based on a visual investigation of the sensation of light and reflection on water, consisting of short, computer-animated sequences. These have been designed to be shown on plasma screens as slowly moving artworks.

The primary intent is in realising the sensations evoked by the play of light on water. The colours and shapes generated by the movement of waves and ripples, the changing surface of reflections, the light bouncing off the water surface. The sensation of light on water generated by specific rivers and seas at different times of the year.

The work explores the area between realism, exploring the tools now available in a 3D computer-animation system for these purposes, and abstraction, looking at the aspects of colour, form, and movement. The view is presented straight on to produce a flat perspective in line with the picture surface.

The work is influenced by a number of artists, primarily Monet and Bridget Riley.

TECHNICAL STATEMENT
The primary tool used in making the *Sparkle Sea* image was the Softimage:XSI V3.0 three-dimensional animation system. The sparkles were produced using the Glimmer output shader for XSI developed by Andy Hayes at Bournemouth University.

- The scene consists of a grid for the water surface and a small semi-sphere for a final gathering reflector.
- The grid (water surface) has waves and a number of fractal displacements applied to it to simulate waves and wavelets.
- The grid (water surface) is lit by an infinite light source and final gathering was applied using a small semi-sphere as the source.
- A specular pass, with the Glimmer'output shader applied, was added to the final image using the Softimage:XSI compositor to simulate the reflection of the specular light emitting from the wavelets.

The image was output on an inkjet printer using archival pigment inks on etching paper.

The work was produced on a Dell PC.

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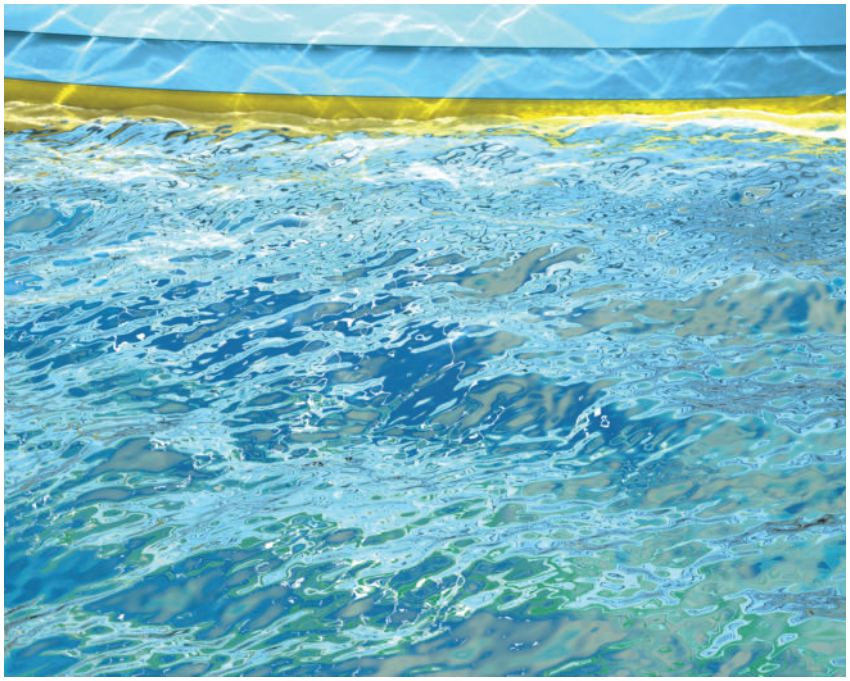

Yellow Boat
32 inches x 28 inches
Computer-generated print

ARTIST STATEMENT
The work is one from a series based on a visual investigation of the sensation of light and reflection on water. The series consists of computer, generated prints and computer, animated sequences.

The primary intent is in realising the sensations evoked by the play of light on water. The colours and shapes generated by the movement of waves and ripples, the changing surface of reflections, the light bouncing of the water surface. The sensation of light on water generated by, specific rivers and seas at differing times of the year.

The work explores the area between realism, exploring the tools now available in a 3D computer animation system for these purposes, and abstraction, looking at the aspects of colour, form and movement. The view is presented straight on to produce a flat perspective in line with the picture surface.

The work is influenced by a number of artists, primarily Monet and Bridget Riley.

TECHNICAL STATEMENT
The primary tool used in making the *Yellow Boat* image was the Softimage:XSI V3.0, three-dimensional animation system. Additionally, Adobe Photoshop was used to paint the sky image for reflection.

- The scene consists of a grid for the water surface, a modeled boat, a semi-sphere for the sky, and a grid for generation of the caustics.
- The grid (water surface) has waves and a number of fractal displacements applied to it to simulate waves and ripples.
- The grid (water surface) receives caustics.
- The semi-sphere (sky) has a painted image texture mapped to it to simulate a sky with light cloud.
- The modelled boat has two colours applied and receives caustics.
- The grid (caustics generator) has waves and a number of fractal displacements applied to if, and it transmits caustics onto the boat and water surfaces.
- The scene is lit by three lights: one for the whole scene, one for the boat and one for the caustics generation utilising one million photons.

The image was output on an inkjet printer using archival pigment inks on etching paper.

The work was produced on a Dell PC.

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Melissa Harshman

Leap of Faith
39 inches x 23 inches
Lithography and inkjet

ARTIST STATEMENT
For the last five years, I have used the computer as a tool to create images. I am interested in the different ways a variety of recognizable images can be juxtaposed and altered in meaning and narration by my new combinations and compositions. The computer allows me to move items easily and play with transparency, scale, and color. The image is then "brought out of the box" via traditional printmaking or painting methods.

In *Leap of Faith*, the diver serves as a metaphor for many situations in life where one must take that "leap of faith" into the unknown and trust one's instincts. The movie starlets and children's doodles at the bottom of the image refer to different cultural stages, desires, and developments in women's lives that echo this metaphor.

In most of my work, the focus has specifically been geared toward identity issues surrounding women. Some of the images are completely whimsical, while others have underlying political content. My goal is to create images that are aesthetically pleasing and conceptually significant, often playing off the meaning and inference of the chosen image.

TECHNICAL STATEMENT
Leap of Faith began with a scan of a small image taken from the Athletic Association Handbook of North Carolina College for Women 1927-1928. The original size of the image was 2 inches x 3.25 inches and was scaled up to 23 inches x 18 inches. Other images were then scanned and layered with the original image in Adobe Photoshop until the desired outcome was achieved.

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Acrobats
21 inches x 13.5 inches
Inkjet print

ARTIST STATEMENT
In *Acrobats*, the two women in the balancing pose serve as a metaphor for the challenging and hectic situations we face daily in a "multi-tasking" society. On a personal level, the movie starlets, numerical calculations, and counting marks signify cultural pressures to succeed and what that means. In contrast, the lotus flowers represent the inner, spiritual aspects of my life. The acrobats, therefore, symbolize the attempt to synthesize and balance conflicts that arise from these opposing desires.

TECHNICAL STATEMENT
Acrobats began with a scan of a small image taken from the Athletic Association Handbook of North Carolina College for Women, 1927-1928. The small image was sized up to a much larger scale. Other images from sources such as old scrapbooks, memo books, and fragments from some of my other digital images were collaged and layered with the original photograph using Adobe Photoshop. The image was then re-worked until the desired outcome was achieved.

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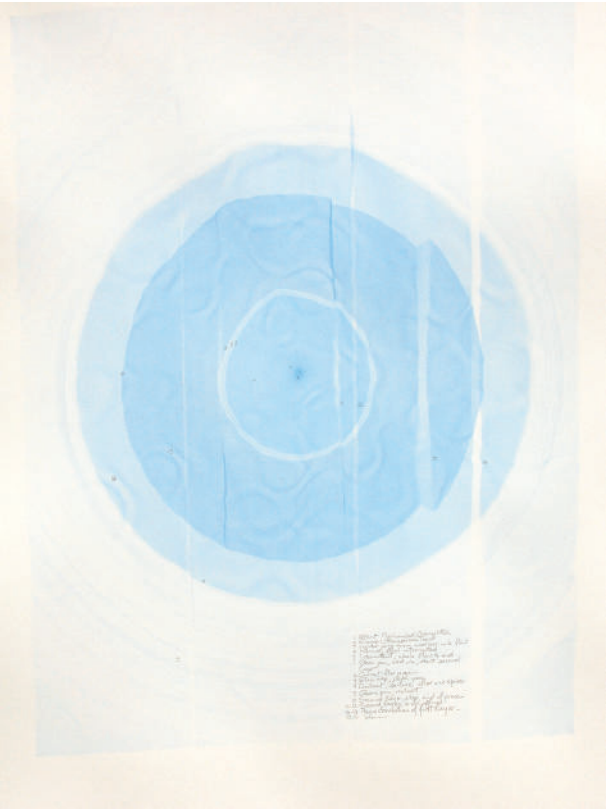

Still plotting after all those years ...
45 inches x 32 inches
Ink on paper (acrylic ink, technical pen and plotter)

ARTIST STATEMENT

I draw because I love to draw and always had a passion for drawings.

Since the late 1970s, I have been working with the conviction that to gain power and beauty, drawing should become pure mental activity more than gestural skill. I have endeavored to make it so by banning completely the physical side of drawing. I create drawings by writing original code that will define the very concept for each piece.

Running this code produces the path that guides the device that actually produces the physical proof on paper with pens, leads, or brushes.

My process is thus akin to composing or choreographing or simply ... thinking. It starts with the vision of the piece. It continues with the precise anticipation of the imaginary hand motions or the real pencil path implied by the development of the drawing. It ends with a final proof of concept on paper.

What makes it so rewarding is my continuing fascination with the slow, mesmerizing apparition of each drawing on the paper and the anticipation of witnessing the correct unfolding of the proof. There is also the possible good surprise of a happy “accident,” always tempered by the possible ink failure.

Here, everything went wrong for the proofing, so much so that I annotated all the problems by hand afterwards. Nevertheless, I gave the piece a name that marks my attachment to my charming but temperamental plotters.

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Transport IX
26 inches x 22 inches
LightJet digital image on Fuji Crystal archival photographic paper

ARTIST STATEMENT

Transport IX renders electron flow paths in a two-dimensional electron gas. It is based on the actual electron flow patterns for electrons riding over bumpy landscapes. The electrons have more than enough energy to ride over any bump in the landscape, and the concentrations of electron flow are newly discovered indirect effects of that bumpy ride. The channeling or branching was unexpected and has serious implications for small electronic devices of the future.

The Transport series was inspired by the electron-flow experiments of Mark Topinka, Brian Leroy, and Professor Robert Westervelt at Harvard. Scot Shaw of my group and I did the theoretical work.

Transport IX follows the paths of electrons for a short time. It represents the effect of starting the electrons in a narrow beam at two different places on the random potential landscape on which they live. The distinct and overlapping patterns resulted from the particular hills and valleys encountered from a new location. It is seen that the branches emanating from different initial launch points cross and seem independent, confirming that they are not due to any fixed features in the potential landscape but rather are due to the history of encounters with hills and valleys "upstream."

There is a connection, a feedback from the science to the art and back again. In me, this has happened many times and has led to new scientific discoveries through the attempt to produce art. In the viewer and also in me, I strive for feedback of a different kind. I want the scene being rendered to evoke emotion and familiarity so the viewer can project back onto the science behind the image to sense the power and mystery in the world of quantum mechanics and the microscopic chaos that is just under the surface.

TECHNICAL STATEMENT

The computer is a new artistic medium. It can draw fantastically detailed and imaginative things that are impossible for human hands to render. Most of the images in this work are produced pixel-by-pixel using a computer algorithm, which I have written. I send the pixel data to a high end LightJet imager, where typically 150,000,000 pixels are rendered by a laser onto archival photographic paper. The paper is then developed in the traditional way in chemical baths. So far, the color brilliance and permanence of this method exceeds the best inkjet technology.

As a theoretical chemical physicist, I have always taken a very visual and intuitive approach to my research, which involves application of quantum mechanics to various problems in the atomic world. I produce images as a regular part of my research, believing that the visual processing power we carry around with us is enormous, and that the right image can go a long way to prove a key point or leave a lasting impression on a colleague. Imagery is a formidable tool, to teach ourselves, our colleagues, and the public. Images are increasingly being used in the mathematical and physical sciences. The computer has made them compelling, by drawing things of incredible information and detail (and sometimes beauty) in a short time.

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ARTIST STATEMENT

Orai/Kalos (from the Japanese *orai* – comings and goings, traffic, communication and the Greek *kalos* – fair, beautiful) presents images and audio in an interactive computer-driven installation that continually varies its content and composition. *Orai/Kalos* is an intermedia work, where sound and image events are driven by the same underlying structures, and an interactive work, where each visitor generates new configurations.

The installation uses a circular table as a projection surface to display a computer-generated image. The table is equipped with embedded sensors. Visitors wave wands over the sensors to control the installation. Sound is emitted from stereo speakers beneath the table.

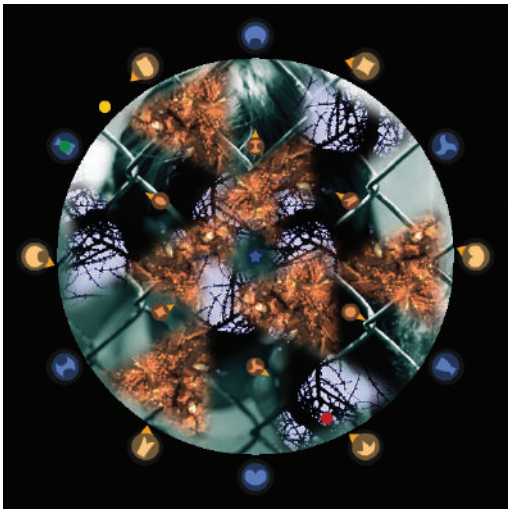
Visual events consist of samples of natural and synthetic patterns. The patterns shift size, position, and rotation in overlapping layers, sometimes revealing hidden images. Sound events consist of natural and synthetic sounds. The sounds shift duration, pitch, and timbre using granular synthesis, a technique that uses overlapping layers of short samples to produce a "cloud" of sound.

Orai/Kalos is not "synesthetic art," where specific visual and audio events correspond. Rather, its sound and image events are generated by encoded structures that are "transcoded" from one sensory modality to another.

As an interactive work, *Orai/Kalos* requires social interaction to reveal some of its hidden aspects: one person alone cannot reach all the sensors, and some events can only be triggered by three wands.

In the installation, images and sounds of nature mix with images and sounds of human cities and technology. Reduced to patterns, natural and synthetic sounds and images blend hypnotically; however, when visitors begin to interact with the display, images and sounds sampled from communications media emerge. Topical and possibly distressing content displaces the soothing kaleidoscopic display, but participants may take compensatory pleasure in their apparent power to control events.

Orai/Kalos attempts to examine how communications technologies are mixing geographical locations and persons together into new constellations. It is easy to be hypnotized by the speed and momentum of these changes, by the transformation of the world into patterns of information. Fortunately, our state of technological distraction is continually interrupted by events, large and small. Will our dearest desire be to return to distraction, or will we waken enough to construct a more just world?



Orai/Kalos
10-foot square floor area, 18-foot vertical space for downward projection
Interactive multimedia installation (table, sensors, video projector, audio, computer)

TECHNICAL STATEMENT

Orai/Kalos is presented as a stand-alone Macromedia Director projector file and a group of MaxMSP files. When the files are opened and the projector is launched, animated "agents" appear over a continuously shifting display of pattern samples. The agents' position governs the average position from which a sound buffer is read to create a spatialized granular-synthesis "cloud." Agents move between "nodes" superimposed on the images. Users can control the agents' paths by touching the nodes with magnetic wands, triggering sensors embedded in the display surface. Different combinations of nodes generate specific behaviors in the display and the agents: new images and sounds arrive; their size, number and symmetry change; the speed of the agents and hence of events changes; the sound becomes sparse or dense, etc. Image changes correspond to sound changes in subtle but audible ways.

Although I use it to contrast soothing patterns with disturbing media imagery, *Orai/Kalos* can use any sounds and patterns. Now in its first revision, the application permits a designer to replace the current image and sound files. Although designed to use numeric input from sensors, *Orai/Kalos* can be controlled with a mouse or over a network. A tool in the Director file can be used to assign transition probabilities to govern the sequencing of images, permitting a degree of compositional control. Granular-synthesis parameters for the sounds can also be altered.

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ARTIST STATEMENT
Data from measurements of brain waves are transformed into a wallpaper pattern and a three-dimensional sculpture. The sensory organs that are stimulated and inspired by looking at art and associated cerebral events are performing as artwork themselves.

The sum of senses plus awareness equals the true sense. This would be defined as "synesthetik."

Wallpaper: The wallpaper project literally uses the "neuronal pattern" as a pair of terms and transforms them in a visualized context (perception). A viewer was asked to look at the famous painting "Who is afraid of red, blue and yellow" by Barnett Newmann in the Staatsgalerie in Stuttgart, Germany, and the viewer's cerebral responses (wave patterns) were transformed into paper wall strips.

Brain sculpture: For the "brain sculpture," the wave patterns were milled in a precise landscape-like sculpture of wood or plastic.

Concept: Electroencephalography (EEG) allows measurement of brain activities in real time. Cerebral activities are defined as neuronal patterns and interpreted as perception. In general, more activity is found in the right hemisphere when the subject is being creative. And cerebral activity increases during perception. In this work, EEG measurements allow the observer to perceive brain activity during perception of an aesthetic event.

Summary: EEG technology can reveal perceptive activities within the brain of the artist as well as in the brain of the recipient. Thus mental processes that are triggered during artistic events are not limited to the brain's interior, but may also be reflected in a two-dimensional "picture" or "in" a three-dimensional sculpture.

TECHNICAL STATEMENT
The so-called "human factor" is presented opposite to an increasingly digitized and herewith dematerialized society of information.

The binary code reflects the cerebral procedures:
0 and 1 stand for: will a stimulus be transmitted: yes or no?
The result is defined as network.

When the different centers, from the retina up to the brain, simultaneously interact in a network, we are able to see.

the appearance of cerebration subjects the interface between hardware and software, and between the cerebral and spiritual processes, to a combination of PC and EEG and reflects interior processes.

the appearance of cerebration
wallpaper 1.5 meters x 3.5 meters
sculpture 0.2 meters x 0.3 meters x 0.1 meters
Wallpaper wood

The reflection is an aesthetic product manufactured with modern procedures (digital print, computer-assisted CNC-milling machine).

EEG: EEGs are recorded with a Medtronic Ambulatory. The recorded signal is in the frequency range of 1-15 Hz. Customized software, developed by Frieder Weiss, analyzes the wave pattern in real time and transforms it into a landscape-like picture by a Fast Fourier Transformation.

Print: With digital print procedures, the cerebral signals can be processed.

Plastic Sculpture: The recorded data are transformed into IGES or DXF files for computer-assisted machine systems and precisely rendered by a five-axle-driven CNC-milling machne.

In all procedures, there is a permanent feedback mechanism:

This area of technical awareness has the goal to detect people (humans) in the environment of computers, to identify them, and to investigate significant measurements.

The goal of this method/technique is to investigate and interpret human actions through art.

When processing the measured results of cerebral activities, the technique itself is being used as "cerebral activities" and will influence the result in the same way as the aesthetic result. This application, of course, doesn't require a certain cerebral activity, but includes it as an integral.

"Interface as Interface in the sense of bio-aesthetic feedback."

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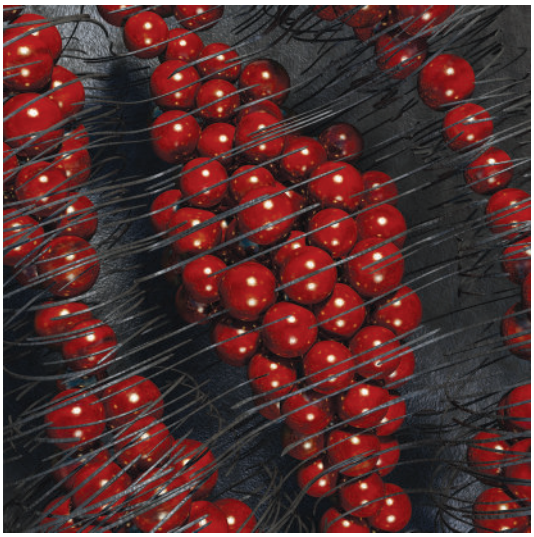

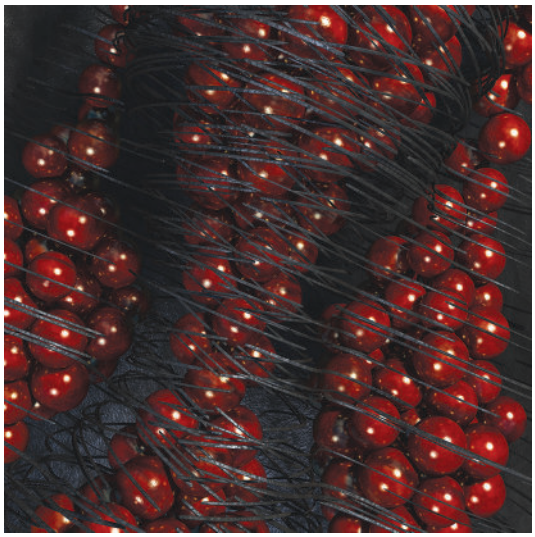

2003.4a and 2003.4b
62 inches x 62 inches x 2 inches each
Digital image on color photographic paper

ARTIST STATEMENT

The iridescence of a beetle; the twisting surfaces of a wilting leaf; the spiral forms and sutures of a fossilized mollusk shell; fissures growing in drying mud; the arches, loops and whorls of a fingerprint – all are examples of the natural forms and patterns that inspire my images. I am intrigued with combining ideas from a number of sources and the contrast and ambiguity arising from those combinations.

I often include many objects in my works, all similar in form, yet each unique in its details. Those details of color and texture mimic the level of physical detail found in the natural world and create an illusion of reality even while the viewer is confronted with the practical knowledge that the objects illustrated do not exist, furthering the purposeful ambiguity of the work.

TECHNICAL STATEMENT

The works were created entirely in Alias Maya, augmented with custom software developed by the artist. Final renderings were completed in a single pass with no compositing. The prints were produced on a Cymbolic Sciences (now Oce) LightJet photographic plotter, which exposes color photographic print paper with a combination of red, green, and blue laser light.

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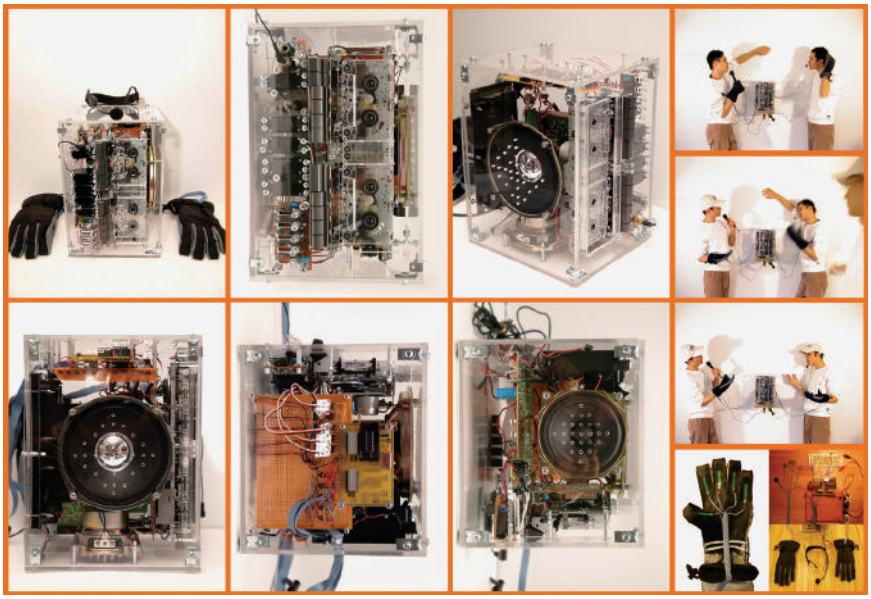

Miscommunication
150 centimeters x
150 centimeters x
70 centimeters
Loop device, 2
data gloves, and
2 microphones

ARTIST STATEMENT

As a multimedia artist, I work primarily in interactive audio/visual installation and performance. Through my research and creative practice, I develop new social communication systems. My artwork explores the lives of people who are marginalized by society due to social and physical challenges, which have debilitated them in some way. Since I arrived in the United States in 2003 from Korea for further research, I have been able to personally address this alienation in terms of interpersonal communication.

Miscommunication deals with the language barriers commonly experienced by non-native speakers. To communicate with each other, most of us use sound as well as physical gestures. Even though sounds have specific meanings in their particular contexts and uses, we often experience communication barriers. This raises some important questions: How can we fully understand each other, and what is the alternative of language? By exploring the connection between movement and sound, meaning, and perception, this piece confronts viewers with an unintended communication barrier.

Through this work, I am also attempting to explore possible methods of sound communication. Participants use data gloves to control the output of a sound device. As they speak into the device while altering the sound with the gloves, they can hear their multiple-layered voices being irregularly manipulated. Echoes are controlled by the sensors in the gloves. When they hear their duplicated voices though this device, they may feel the confusion of many simultaneous sounds in the space. The distracting effect is similar to trying to calculate a math problem in your head while friends shout random numbers. Miscommunication allows participants to indirectly experience the complexities of the communication barrier through chaotic sound and language.

TECHNICAL STATEMENT

This installation consists of five main components: the sound record-and-play component (which uses a newly designed loop cassette tape), the sound alteration component (five standard servos and a servo controller), two data gloves that have 10 flexi sensors, two sound input devices, and two speakers.

As participants speak into the microphones and make various hand gestures while wearing the data gloves, the sound-generation device makes altered multiple-layered voices similar to a modulated electronic echo.

With the flexi sensors in the data gloves, each finger can manipulate specific variables of sound. Each sensor in the data gloves sends signals to the main servo controller, which gives five servos specific movements to modulate five properties of sound: sound speed, speaker volume, physical echo, microphone volume, and balance. Through the speakers, participants hear their irregularly altered multiple-layered voices.

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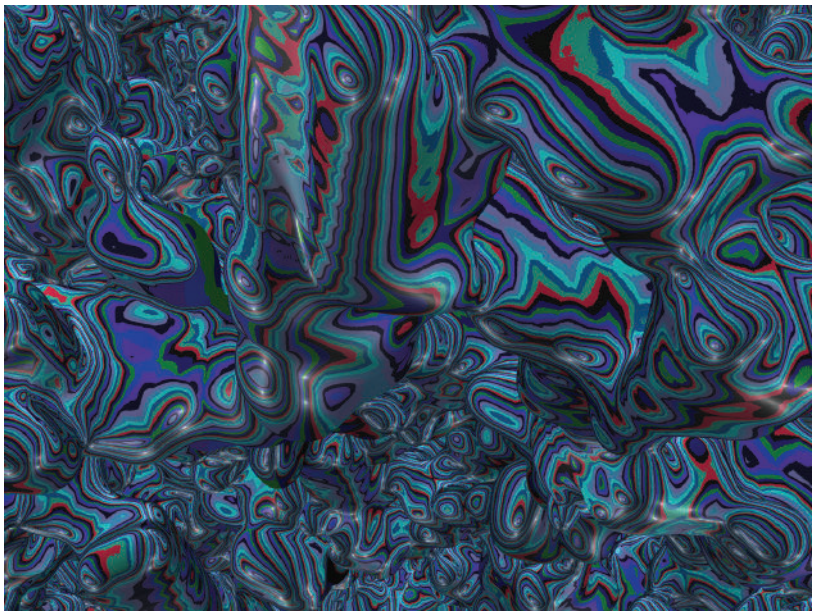

CORE-CELL Tower
60 centimeters x
80 centimeters x
60 centimeters
Renticular image
with light box

ARTIST STATEMENT
Three-dimensional images are more sensually appealing than two-dimensional ones. In 1979, we presented a Japanese traditional mask called Hannya as an optical three-dimensional artwork. After that, we sought new ways of presenting artistic impressions in three-dimensional photography. In *CORE-CELL Tower*, we introduce a mixture of spatial effect and false illusion. The resulting dizziness, a consequence of abstract patterns generated by algorithms, is found to be luscious. An abstract pattern amplifies the effect of spatial awareness in three-dimensional photography.

TECHNICAL STATEMENT
The renticular image used in this work contains 15 to 20 images. Each image represents an image viewed from slightly different viewpoints. The images are placed on each face of a tower. Viewers can walk around the work and enjoy different views and the effects of false illusion.

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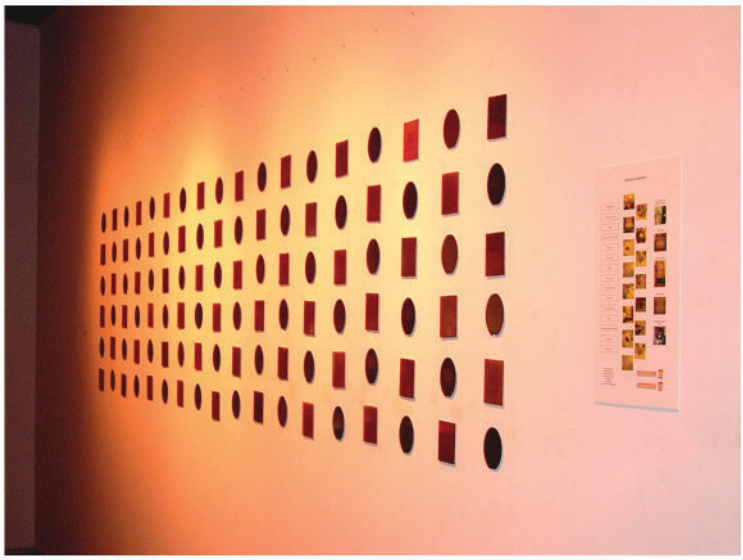

Meditation
2.8 feet x 8.8 feet
Crystal Wafers, Polymer Plates,
Chromium, Gold, Titanium, and Copper

ARTIST STATEMENT

My body of work presents the concept of transcendence and spirituality in Eastern philosophy. It encompasses Eastern principles and spiritual meaning, showing parallels between the spiritual and the physical plane. My Buddhist experiences significantly influence my work because they have a strong emotional, spiritual, and intellectual effect on my life. Viewers may not receive my message directly, but it will challenge them to discover their own paths to the spiritual world in this moment in time.

In this work, I used a pattern generator to experiment with the traditional lotus motif on semiconductor material. This image represents a transcendent path from the past to the present and from the material world to the spiritual world. I attempt to express new concepts of design that are transcendental dialogues beyond the appearance of the physical world.

My belief is that art and science are ultimately one. One does not exist without the other; improvements in one reflect improvements in the other. The union of artistic idea and scientific exploration will bring new opportunities and knowledge, not only for art itself, but – through the integration of the two fields – a new insight.

TECHNICAL STATEMENT

Three different patterns of lotus motifs were impressed on silicon crystal wafers and polymer plates using scientific methods. The patterns were prepared by a pattern generator, which is used to make digitized patterns of circuits for semiconductor devices from AutoCAD. To transfer the images of the motifs, methods of semiconductor-device fabrication were employed, such as metal deposition using an electron-beam thermal evaporator, ultraviolet optical lithography, and metal etching. Patterns of data codes were overlaid consecutively on the transferred motifs.

The deposited metals were chromium, gold, titanium, and/or copper with thicknesses several hundred times thinner than a sheet of paper. The process of ultra-violet optical lithography is similar to the process of photolithography and involved three steps: application of UV light-sensitive photo resists on top of deposited metals, exposure of UV lights to transfer patterns though digitized images of motifs or micro-bar codes, and development of exposed photo resists. Using metal etching chemicals, metal patterns of motifs were created along with the developed photo resist patterns.

This project was supported by the Center for Advanced Microstructures & Devices at Louisiana State University. I would like to thank Dr. Josef Hormes and Dr. Jost Goettert for providing the resources and facilities. Especially, I would like to express my gratitude to Yoonyoung Jin, Research Associate, for his extensive support and assistance.

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Vanitas No.23
17 inches x 23 inches
Digital print on paper

ARTIST STATEMENT
Vanity Studies is a series of still-life images based on the 17th-century Vanitas paintings, depicting compositions of objects that symbolised the vanity of worldly things and the brevity of life. After initial research on the Vanitas theme, I turned my attention to compositional and aesthetic challenges, since the conceptual strength was established and would be consistent through the series, without specific ideas for each picture. This allowed for a more expressive process, since images were not dictated by their carefully selected title but from the spontaneous visual chemistry between objects that take on unconventional meanings and the need for different versions of images that had to be explored. Components of the traditional compositions were mixed with contemporary and technology-inspired elements, in order to graduate the symbolic value of the imagery to the present.

For an artist infatuated with technology, its shapes, and its surfaces, this series has been an opportunity to approach organic subjects. It helped me discover or, better, rediscover nature's relevance as the foundation to all. This sharp thematic turn was possible in part because the Vanitas still-life was characterised by a prominently displayed skull, a motif I consider visually stunning and symbolically potent. Vanity Studies refers not so much to the futility of seeking what does not last, but the surprising aesthetic qualities of the ordinary.

TECHNICAL STATEMENT
The digital, on-screen creative process is not based on sketches or pencil studies, in order to achieve a more expressive result influenced by the interaction of elements, through trial and error. By not determining concepts and compositions in advance, the images evolve in a fluid manner and utilise transparency and the textural attributes of the software.

The only groundrule for the series was that no camera could be used. The raw photographic components are scans of individual objects at different angles, done in the dark, in order to take advantage of the natural distortion that occurs when the scanner lens tries to capture depth.

The backgrounds are mostly found distressed surfaces of metal, wood, or plastic, and a layout of a large number of small objects of the same kind on the glass, in order to create grids or random piles. The accidental results of the scans contributed to the "loose" aesthetic outcome, even though each image went through several versions before printing.

Adobe Photoshop 5.5 was used to connect and manipulate the sources into seamless visuals. Only the basic set of software filters and effects were utilised on the multi-layered files, completed in greyscale before they were colour tinted. I used an eight-year-old Agfa Arcus II scanner that broke frequently, exactly when the series was finished, or the other way around.

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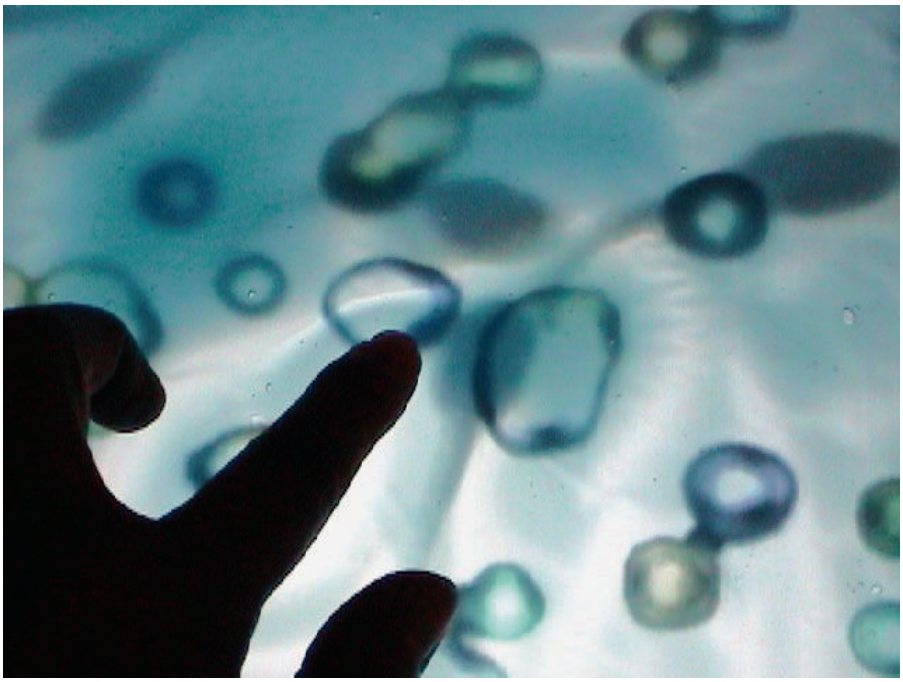

Touch the drop
400 milimeters x 400 milimeters x 1000 milimeters
Original touch-screen display, PC

ARTIST STATEMENT
This work is a new type of interactive mixed-reality sculpture. Viewers can feel a picture with a touch-screen display that we developed to convey a unique sense of touch. The display's jeffy-touch technology provides an interface that viewers touch to manipulate a drop of water.

Our interest is in creating an imaginably artificial, mixed-media environment that exists between real life and virtual space.

TECHNICAL STATEMENT
Touch the drop consists of three components: image generation, movement of a drop of water to generate an image of a drop of water, and a sound-feedback system.

The system captures an image from a from touch screen in real time and extracts a position and shape, then narrows down the information required to generate a drop of water and transmits a message to the image-generation component. This component shapes generation of the drop of water and animates it in real time. The shape-generation algorithm for the water drop uses a meta-ball-generation algorithm to generate the drop's shape and behavior.

The system also uses MIDI data to generate sounds that correspond to the displayed events.

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E-mailing with Grace
10 inches x 12 inches
x 6 inches
Artist's book

ARTIST STATEMENT
This work is an artist's book/box. It is based upon a book form that I learned from Kumi Korf. The Japanese hinges are multi-directional (like piano hinges) so the book can open in different directions. The inside can become the outside, and the outside can become the inside. The book can also fold into a shrine-like container.

I am interested in representing the integration of an intimate interior and a public exterior experience. *E-mailing with Grace* uses home and house as a metaphor for being: where each space represents a different aspect of memory and psyche. The exterior is an architectural structure, giving the appearance of solidity and containment. The interior space is intimate and poetic, including an enclosed garden, three windows or elevator shaft, floors and a walnut table containing small prints of actual email and a key, and a digital monoprint of my mother, Grace, watching over it all through a screen of mulberry paper.

The book is also about the experience of thwarted communication in the spirit of "Alice in Wonderland." In 1998, during the last few months of her life, my mother began to learn to use email. We sent email messages back and forth between New York and Skopje, Macedonia (where I was working on a 1998-1999 Fulbright grant), or we tried to at least. Both of us experienced some frustration in the effort. My mother struggled with learning an entirely new and alien form of letter writing, and my connections were often intermittent. We did manage to send our electronic letters back and forth, though sometimes they didn't make it. One year after my mother passed away, I found email that she hadn't been able to send to me on her hard drive. It was as if her voice came back through the ether. This work is for her.

TECHNICAL STATEMENT
E-mailing with Grace is a cross-disciplinary project that combines book arts, collage, digital imagery, photography, and digital printmaking. The digital techniques include various image manipulations in Photoshop 7.0 and digital printmaking techniques. These printing techniques include digital monoprint transfers, solar etched plates using digitally created film, and straight-from-the-printer Canon color prints.

All of the materials I've used have significance. They are as carefully considered as the placement of the various elements in the piece. Most of the paper is handmade. Some of it is mulberry and was specifically made for digital prints. Simon Semov gathered the fiber, and we made this paper together in Macedonia.

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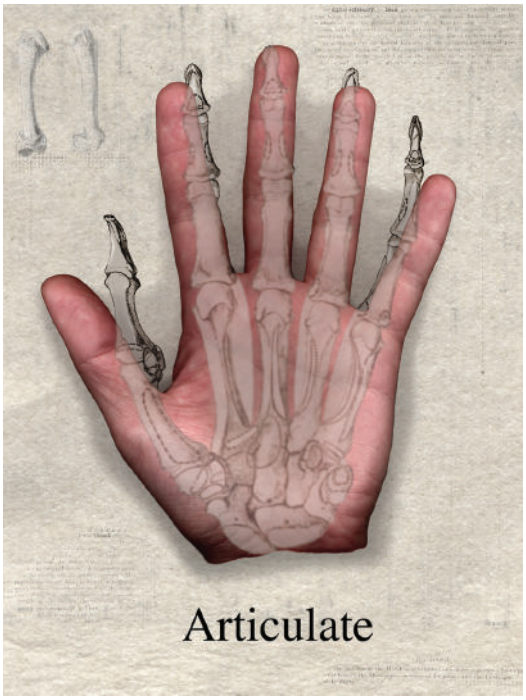

Observational Drawings - Hand
30 inches x 42 inches
Archival inks on watercolor paper

ARTIST STATEMENT
There is a very poor connection between language and objective reality. Our most serious semantic problem occurs in the everyday act of naming or describing things. The word is not the thing, just as the map is not the territory. While there is never final resolution between the word and the thing, we are a species dependent on the abstractions of language, and in the end, the word often supersedes the image. This dualism creates a fragmentation that pervades both our individual bodies and our culture as a whole.

Observational Drawings explores Western society's reliance on objective definitions in language, while illustrating the folly of this dependence. The work addresses the use of identifying language and symbolic representation by portraying body parts, void of social gender-role identifications, literally transformed through the addition of abstract and obscure messages. Reliant on visual codes, but dependent on bodily functions, *Observational Drawings* is a comment on body language, for we live at the level of our language.

TECHNICAL STATEMENT
The *Observational Drawings* series was created in Adobe Photoshop 7.0 and Corel Painter 8.0 on a Macintosh G4. The drawings were produced with scanned objects and anatomical drawings. The textures in the images were completely fabricated in the computer as a product of digitized surfaces. Hidden amongst the textural illusions are noticeable references to digitized imagery intended to raise questions as to process and material condition. The juxtaposition of traditional materials and digitized imagery adds to the thematic questioning of the work: image versus word, objective versus subjective.

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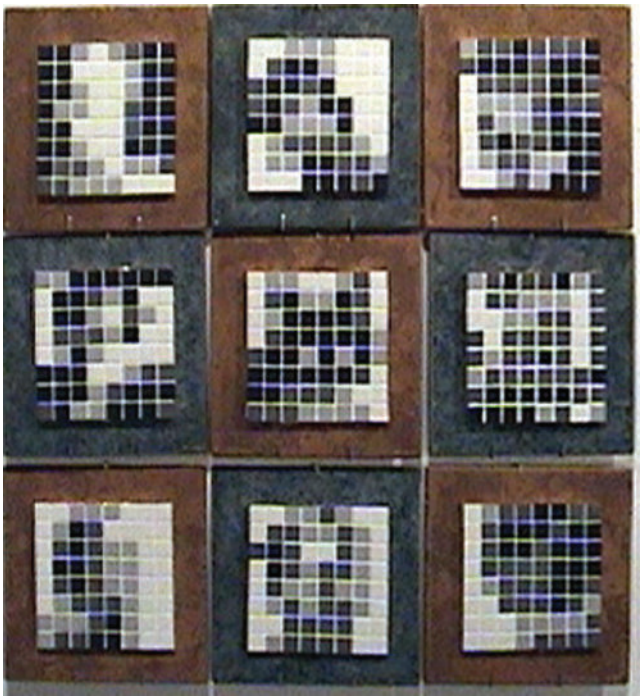

Portraits in 8 Bits or Less
40 inches x 40 inches, 9 pieces
12 inches x 12 inches each
Ceramic

ARTIST STATEMENT
When originally conceiving the translation of low-resolution digital photography to a physical form, I wanted to consider the historical precedents to the Cartesian image grid. The most logical of these is the Byzantine mosaic, which is a close ancestor of the digital bitmap. Although not rectilinear in the case of the Byzantine, the use of colored ready-made pieces of media to create a larger whole has a rich artistic tradition and is seen in arts and crafts from collage to needlepoint. This technique is a perfect match for low-resolution imaging and physical representations. However, the images in question were allowed to abstract themselves to a resolution of 8x8 pixels, where only the most basic elements of composition and form would remain. In this way, these seminal works in ceramic digital imaging would explore the aesthetics of translation from the digital to the physical and reassign the role of the portraiture to an abstracted composition.

TECHNICAL STATEMENT
These wall sculptures are translations into ceramic of portraits created from low-resolution images from my Casio Wristcam. The source images, already at a low 120x120 pixel x 256 grayscale resolution, were allowed to degrade to a sub-iconic resolution of 8x8 pixels and flattened to a two-bitplane depth (four grayscales). These images were then recreated using specially ordered tiles to match the tonal values in the images.

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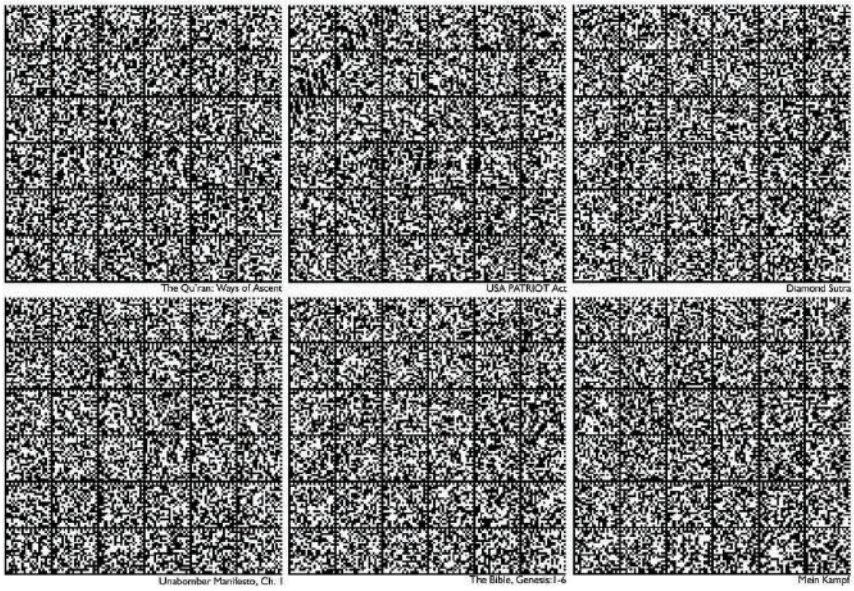

Encoder Study - 1992-2003
16 inches x 22 inches
Archival print

ARTIST STATEMENT

To the computer, there is seldom a qualitative judgment of the information it processes or contains. Its function is to store and process information. With the use of computer technology, data are encoded into various patterns for reading by scanners and bar code readers that are completely opaque to the human reader and human valuation. The aesthetic of these codes is strangely compelling, much like that of the Rosetta Stone, and beckons us to try to read the code, but without the proper tools, we can't. On the back of one's identification card, any information could be encoded, and it would be difficult to determine what data the card actually contains.

Encoder is a 1992 concept that was realized in part in 2003 through comparison of three sacred texts with three texts that could be said by many to be profane, all of which have been encoded into a pixelated DataMatrix format. Three things are striking about these texts. Although variations can be seen in the data patterns at closer inspection, the patterns placed in context with one another lack visible differentiation, suggesting a total lack of qualitative value between sets of data in a database, and also the opaque wall of perception that exists between the human and computational environments. This hints that the downside of security is a potential lack of access to information or context. Lastly, the eerie beauty of the abstracted patterns of information taken in context with their content is grounds for reflection.

TECHNICAL STATEMENT

Six portions of what are considered sacred and profane texts were encoded with a DataMatrix encoding scheme using commercial labelmaking software. The resulting images were then assembled in a 2x3 matrix in Photoshop with their respective titles, and then printed using an archival-quality Epson 2200 printer.

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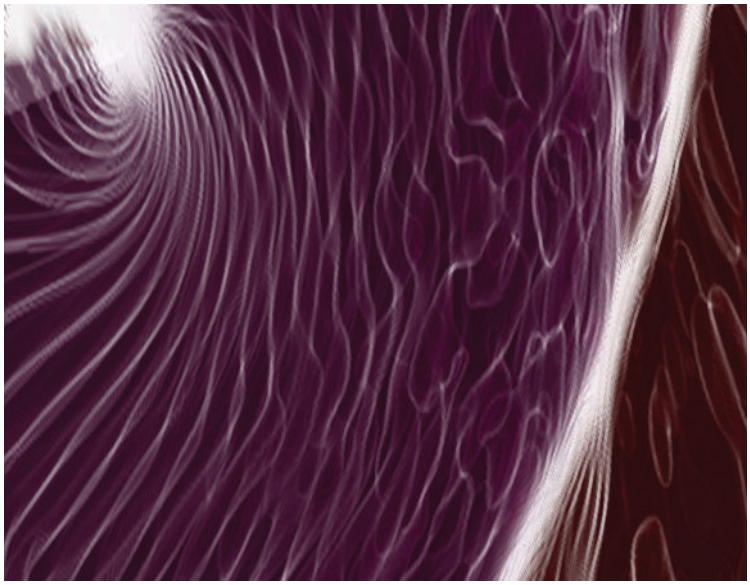

Art from Ephemeral Scientific Moments: "Horizonte"
22 inches x 18 inches
Print on canvas

ARTIST STATEMENT

In the classic sense, art has been characterized as any human expression that conveys a sentiment or state of mind from an artist to his or her audience. Such expression may take birth from countless basic media. However, those sources rich in intrinsic value carry over added sentiments that an artist must account for, and in most cases, will utilize to covey additional meaning. As such, it is then possible that scientific data, residing in disk drives and tape decks of supercomputers, could be just as rich and natural a source for art as a piece of marble or a set of paints have proven to be.

Scientific data stored as electronic bits is seldom perceived with an artistic and critical eye, and specially with a willingness to abandon and go beyond the complex numeric, scientific nature it was meant to depict. But in fact, scientific computational research offers a virgin, infinite, constantly renewing medium that, like any natural space, can be seen, explored, and photographed relying on the artist's sensitivities to, in effect, create unique, arousing art. Beyond any intentional accuracy or even erroneous science, this medium abounds in abstract intricacies. Thus it is apt to be rediscovered and exploited as a full, rich canvas of artistic expression.

Fundamentally, just as Franz Kline mastered a seemingly simple use of broad strokes into a meaningful abstract form, so can we strive to find color spaces, data subsets, particular points of view, and space decompositions to create emotional pixel collections. It is a process that could be thought of as exploring a digital scientific path across Abstract Expressionism.

This art is born from delicate moments of inspection and introspection. Simple changes in a color transfer function or a tap of the mouse, changing the view point, alters the image completely. These are fragile moments of art found in a scientific space. Moments that, in most cases, go unnoticed and are often lost. As lit pixel images, or as magnetic imprints on a disk surface, they have but a limited lifespan.

Horizonte is one such snapshot from a simulation of a shockwave hitting a solid wedge-like object. The angle of infraction creates internal pressure waves, which concentrate around the object's surface folds, creating the captured composition.

TECHNICAL STATEMENT

This image was acquired from the volume rendering of a time-step of a simulation of a shockwave propagating across a solid wedge (data courtesy of Caltech's ASCI/ASAP Center). The data are stored as a 12-bit volume in a grid size exceeding 2000x400x400 voxels. The software utilized to create the rendering was VoV, a graphical user interface to TeraRecon's VolumePro 1000 volume rendering card. The color-transfer function was hand created using a simple pencil line-drawing technique offered in VoV, manipulating each of the base red, green, blue, and opacity bands individually. The resulting colors and composition are direct consequences of choices made by the artist and are output directly from the volume-rendering software without any further manipulation.

REFERENCES/LINKS

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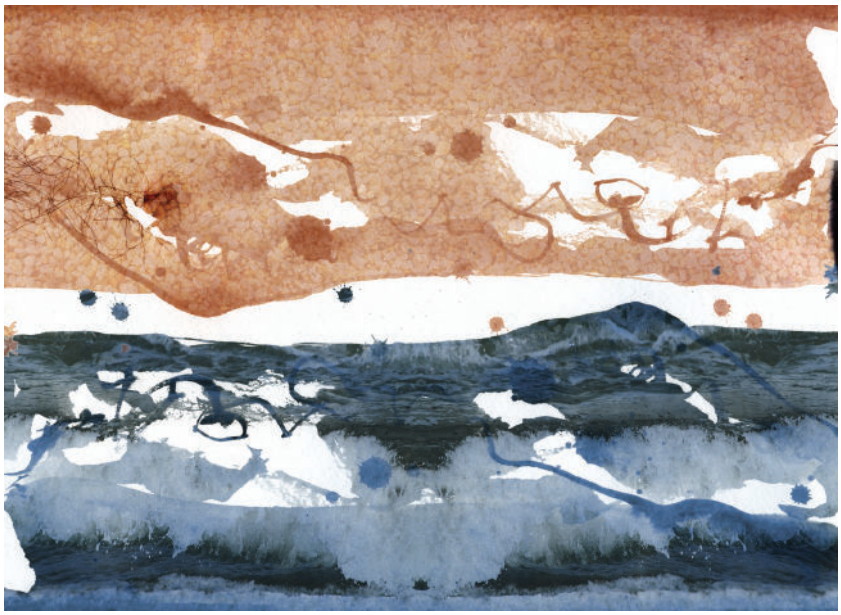

Ocean and Stones
35 inches x 48 inches
Inkjet print

ARTIST STATEMENT

When I started creating what can be called computer art, my product was very much focused on the digital process and digital origins of the work. Now I am trying to introduce more of the human hand, more of the real into the art pieces. I want to create the metaphor of the cyborg on paper. My pieces are about combining a machine and a body. I have done this quite literally by scanning parts of my body and combining them in the computer. I am creating cybornetic art. Although it may have binary beginnings, it has multiplicitous ends. I am doing this by researching the human body and its contours and how that works into composition. These are ideas I want to challenge and question through digital prints.

TECHNICAL STATEMENT

I used the computer to bring the physical and the digital together. I scanned my body, using technology to bring the real into the unreal. By placing my body on the scanner, I was flattening a three-dimensional object to two dimensions. It gives the impression of my body captured behind glass. The scanner was painting my flesh. I took digital photographs of the ocean, again capturing the physical into the digital. I also scanned watercolors and line drawings that allowed me to move the feeling of the hand into a digital format.

With all of these pieces captured in digital format, I used Photoshop as an advanced collage tool. Its blending modes allowed me to create unique effects and integrate the effects of two very disparate layers. The use of masks allowed sharp selection and integration of various objects. By carefully choosing the opacity, I was able to create transitions from an object in one modality to an object in another. Being able to use the HSB color model allowed me to delicately manipulate artistic aspects of a piece's color space. Modulating hue, saturation, and brightness brought a level of sensitivity, not just blind scanning, to the piece. The individual objects transition smoothly because of careful use of dithering and feathering. The layers allow one to easily blend sharp objects like photography and soft objects like watercolors into a single piece.

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Entrapment
4 feet x 4.5 feet x 2 inches (6 pieces)
Inkjet on cloth with metal cages

ARTIST STATEMENT

This series of six images represents the struggle to balance the inner desire to live in harmony with nature alongside a life that denies and defies it. The lives we lead often satisfy the intellectual and social quest for interaction and knowledge but leave the inner self unsatisfied or in conflict with the core values of our existence. Internally, we seek balance, yet we are often unaware of how to achieve it. Externally, we pursue a life that is out of balance and contradicts our inner goals.

Time and commitment are our worst enemies. We are typically unable to recognize or respond to the internal struggle, so we continue to weave our lives around the constraints of time. It is only when our commitment to our inner goals and the pressures of our existing life stage a war with each other that we pause long enough to look at our life as a whole. It is then that we realize that somehow along the way, we lost sight of our relationship with nature, and we have no idea how to re-establish it.

The wire cages represent the constraints of time and the boundaries we impose upon ourselves. The images of feet ground us in the present, and the hands reach out for more. Within the images, the artist's extremities and organic textures were merged with three-dimensional renders of natural growth patterns to depict the struggle to rectify a life out of balance.

TECHNICAL STATEMENT

The individual images within the cages were created using Alias Maya collaged with manipulated digital photos. The 3D geometry used in the images was developed using an algorithmic method of geometry repetition and transformation based on natural growth patterns. Extreme close-ups of nature were combined with images of the artist's hands and feet using compositing in Adobe Photoshop. The images were printed on polyester cloth using a large format Mimaki JV4-160 Color inkjet plotter. To enhance the focus on the concept of entrapment, wire baking baskets were used to enclose and frame the pieces.

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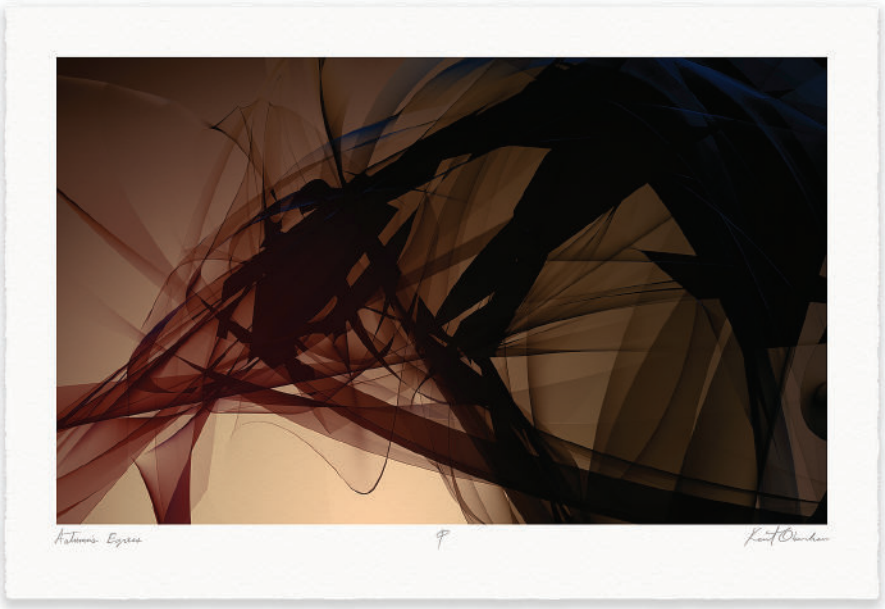

Autumn's Egress
41.5 inches
x 30.687 inches
Giclee print

ARTIST STATEMENT
This piece evokes a sense of the passing of the year into twilight and the coming of winter. The form is a study simulating a flock of birds.

TECHNICAL STATEMENT
Autumn's Egress was created using Cinema4D and alpha plug-ins for a Cidertanks toolset test bed. The form is a series of splines generated from a simulation of a flock of particles. The splines were then lofted to create a NURBS surface. The composite was performed in Photoshop.

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Transmigratory Summation
39.5 inches x 28.375 inches
Giclee print

ARTIST STATEMENT
This form is a linear exploration of a sweeping, fluttering form, changing states from rest to flight and back again. Its motion superimposed upon itself, it takes on a new form of light and shadow.

TECHNICAL STATEMENT
Transmigratory Summation was created using Cinema4D and alpha plug-ins for Cidertank's toolset testbed. The form is a series of splines generated from a simulation of a flock of particles. The particles were coaxed through space using a goal object in real time. The splines were then lofted to create a NURBS surface. The composite was performed in Photoshop with line work done in Illustrator.

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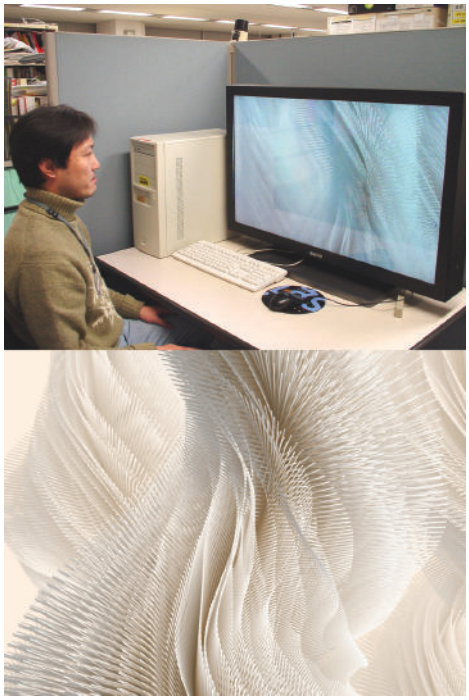

Re:Anjyu
940 milimeters x 660 milimeters x 340 milimeters
Sanyo 40-inch multi-view auto stereoscopic display

ARTIST STATEMENT

I created *Re:Anjyu* in the winter of 2001. At the time, it snowed in Yokohama every week, and I walked home on the silent street blanketed with snow while muttering to myself: “This wouldn’t work, and that wouldn’t do, either.” My memories of that period might have played a part in the creation of *Re:Anjyu*. All the works I've created so far are full of colors; in contrast, *Re:Anjyu* was finished completely in white. Based on the theme “weaving images and sound that ease our mind,” I created this white world, accompanied by piano playing throughout, in order to express feminine gentleness, warmth, delicacy, strength, and softness.

TECHNICAL STATEMENT

Anjyu, which was shown in the SIGGRAPH 2001 Electronic Theater, returns to give you a totally new experience. Every scene of the original movie was not updated but re-rendered into four images using a stereoscopic computing system built specifically for this purpose. Massive experimentation was conducted by engineers (my friends) of various technology areas: no-glasses 3D display technology, high-performance computing, and virtual reality. Fortunately, Sanyo’s 3D displays not only give the sensation of depth, but also allow me to look around to the sides of the object and perhaps even its back.

When the 3D images first appeared on the display, I felt like submerging myself in the world that I created. All the objects in *Re:Anjyu* appear as if they are living in another dimension. Yes, the true face of Anjyu is now revealed at last!

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A Hundred Unfolded Sighs
68 inches x 38 feet x 6 inches
Dye-sublimation/digital printing
on fabric

ARTIST STATEMENT

Human beings have inexplicable emotions that are full of complexity with many layers inside. My works represent the world's duality and uncertainty, but also express my desire to be free from the fear of an unknown future, where we can only accept life as it comes. Self-images are layered in my work in different colors, but they are not important individually; they are part of a whole. Each piece is connected, layered, and flows together. In this way, I take part in a process of nurturing, which forms a basic component of our shared quest for the value of our existence. The idea of uninterrupted continuity is of major significance in my recent works. Since I grew up in an extremely conservative environment, complete with rigid sets of rules and demands, I tend to feel uncomfortable with framed or blocked space. This tendency to openness is also related to my concern with cosmo-centric philosophy, as opposed to egocentric-based ideas. When I process a work of dye sublimation, ambiguous memories, unclear thoughts, and forgotten moments are magnified and brought into the present. The procedure of magnification and assemblage of the particles from the past has been performed and visualized in the form of digital printing. Dye sublimation opened up new horizons in my creative practice. This technology not only keeps the flexibility and transparency of the material's character, where I often find spiritual quality, unconsciousness, and unawareness, rather than just feminine appeal, but it also helps me find the emerging point with digital printing and physical hands-on control for the final piece. The physical qualities of fabrics are maintained even after multiple application of digital processing on the fabric. Fabric flows, moves, and breathes, and, as an art medium, it's very presence in space draws in and engages the viewer to partake in the translation of the image.

TECHNICAL STATEMENT

I take digital photographs that make me think and move my thoughts from the present to the past. I transfer the photos to my computer, where I explore, express, and transform the images through digital manipulation. After I complete the images and magnify them through the Postershop Rip program, the images are printed on special coated paper and are ready for heat transfer onto fabric. When enough heat is provided, the surface opens up the pores of the polymer, and the vaporized ink is absorbed into the medium. When the temperature cools, the pore is closed and becomes a part of the polymer. This process is called dye sublimation. Dye sublimation is similar to traditional lithography, in terms of image capturing. Since the image has to go through many steps, unlike inkjet printing, dye sublimation has not only much more flexibility to change or modify the images in process, but also unknown promises offered by experimental heat transfer. Wonderful textures are intentionally and unintentionally created during heat transfer of the images.

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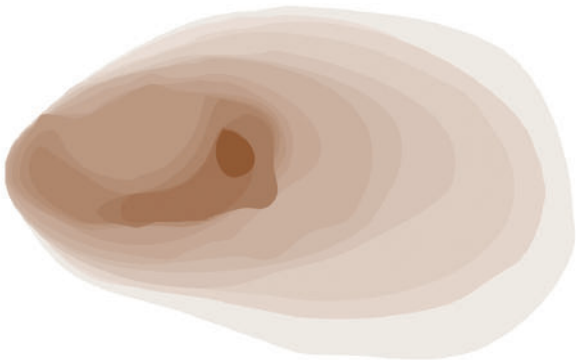

O.S. form no.1, 9 (respectively)
56 centimeters x 52 centimeters each
Digital prints

ARTIST STATEMENT
My art is based on ideas of existence, who we are and what makes us different to the next person, and how our characters and identities are formed and change over time.

Construction of small contour drawings have evolved from the negative forms of 10 individuals' navel casts. The delicate lines carefully follow the individuals' birth chord, creating an image from this part of the body, which, from its cutting at birth, marks the beginning of a new individual taking its first breath and from this developing its self and identity.

In this sense, these drawings can be seen to correspond to birthplaces, birthrights, and, more obviously, land mass. The images are digitally created and produced in a medium that can be seen as very cold and impersonal, immediately depersonalizing the viewer from the very intimate area of the body that is the subject of the drawings. The area is explored as transparent layers building up a three-dimensional form, using tones that would correspond to an ordnance survey ink used on maps. These marks are as individual as fingerprints yet have the potential to change over time, so they are quite fluid in structure.

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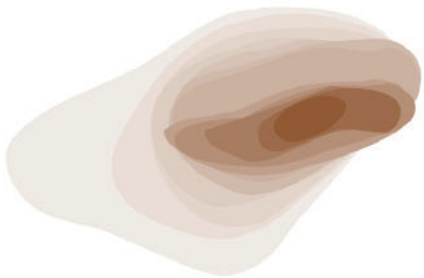

O.S. form no. 2, 10 (respectively)
56 centimeters x 52 centimeters each
Digital prints

TECHNICAL STATEMENT
The first part of the process is to take a cast from a person's navel. This body imprint is then surveyed by pouring a black liquid around the form at varying levels. Each level is documented with a digital camera, and the images are then worked in two image-manipulating programmes to record the layers on top of each other. The lines are smoothed and filled with increasing transparency of ink, from dark brown to white. The final output is a digital print on paper. This contrast between the messy pouring of ink, casting and surveying with the digitized manipulation, and output provides a dynamic aesthetic and, for me, an image of intrigue and abstraction.

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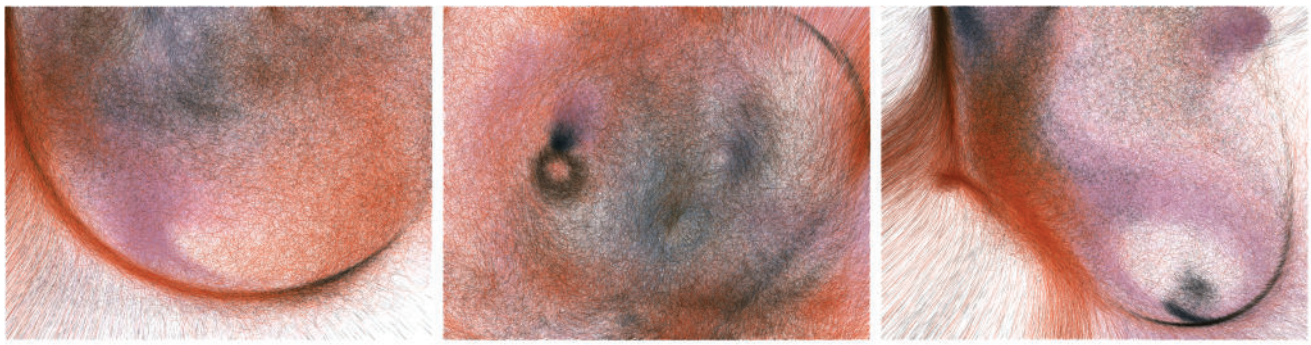
Casey Reas



MicroImage
30 inches x 120 inches

ARTIST STATEMENT
MicroImage explores the phenomenon of emergence through the medium of software. It is a microworld where thousands of autonomous software organisms and a minimal environment create a software ecosystem. As the environment changes, the organisms aggregate and disperse according to their programmed behavior. They are tightly coupled to the environment, and slight changes in the environment create macroscopic changes in the ecosystem. A field of undulating form emerges from the interactions between the environment and the organisms.

The visual qualities of *MicroImage* were selected to make the dynamic structure highly visible. The code specifies the behavior of each organism by defining the rules for how it responds to its simulated environment. Each organism was given the most minimal visual form: a point. To differentiate the various categories of organisms, each type was assigned a distinct color. Aggressive organisms were assigned warm colors, and passive organisms were assigned cool colors. As a further refinement, the values of the colors were modified to change in relation to the speed of the organism. When the organism is moving at its maximum speed, it is represented with its pure hue, but as it slows down, the hue changes along a gradient until it reaches black. Each organism is displayed as a line connecting its current position and its previous 20 positions. Through this visualization, the movement of each organism is seen in both static images and kinematic representations. The linear notation allows the viewer to discern the past and present motion of the organism.

TECHNICAL STATEMENT
The core of the *MicroImage* software was written in one day. The current version of the software has developed through a gradual evolution. While the base algorithm controlling the movement was constructed in a rational way, subsequent developments were the result of aesthetic judgments constructed through many months of interacting with the software. Through directly manipulating the code, hundreds of quick iterations were created, and changes were implemented based on analyzing the responsive structures. This process was more similar to intuitive sketching than rational calculation.

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Cynthia Beth Rubin/Bob Gluck

Layered Histories

ARTIST STATEMENT

The nonlinear narrative of *Layered Histories* is drawn from the possible wanderings of the Marseilles Bible. The history of this Bible is only partially known. Created in Toledo, Spain in 1260, the Bible visually embodies the influences of Jewish convergence with Christian and Islamic cultures. When the 1492 Expulsion forced the Bible to flee Spain, it traveled to the Ottoman town of Safed, where it was amongst religious mystics seeking the means to repair the ills of the world. It subsequently disappeared until, mysteriously, sometime during the 19th century, two volumes of the Bible were discovered in the collection of the Bibliothèque Municipale of Marseilles, where they reside today.

Layered Histories brings together digitally manipulated and layered images and music - evolved from real-world photographs and sound samples - that twist around one another until they cease to be simple representations and become multiple layered moments of imagined juxtaposition. Rubin developed the visuals and narrative, Gluck the music and programming. Music and image are melded together in the viewer's experience, but each follows a separate course of interactivity, coming together in the moment. Both were developed with the vision of reflecting the experience of a timeless object that has seen history and much of the world, and has many stories to tell.

The visitor to *Layered Histories* sits at a table, which is bare except for what appears to be an illuminated manuscript and a reading pointer. As if engaging in a public reading of the manuscript, the “reader” moves a pointer across the tablet. Sounds and imagery change in response to the pace of movement and direction, resulting in shifts in the play between abstraction and recognizable references. The illusion of communal recitation is conveyed in part by the interface design, crafted for interactivity by embedding a graphics tablet within the book, and enclosing the stylus within wooden casing. Gestures on the surface are mapped to a software interface, designed with the application Max/MSP/Jitter, that algorithmically directs the changing display of sound and image.

Sound selection is independent of imagery, creating a changing juxtaposition between media. The concept is to periodically re-contextualize the sound material, in light of the current image theme. The relative speed of vertical motion influences the degree of randomness of those selections and the rate of change of sound choice within any given bank; horizontal motion or stylus pressure initiates cross-fades.

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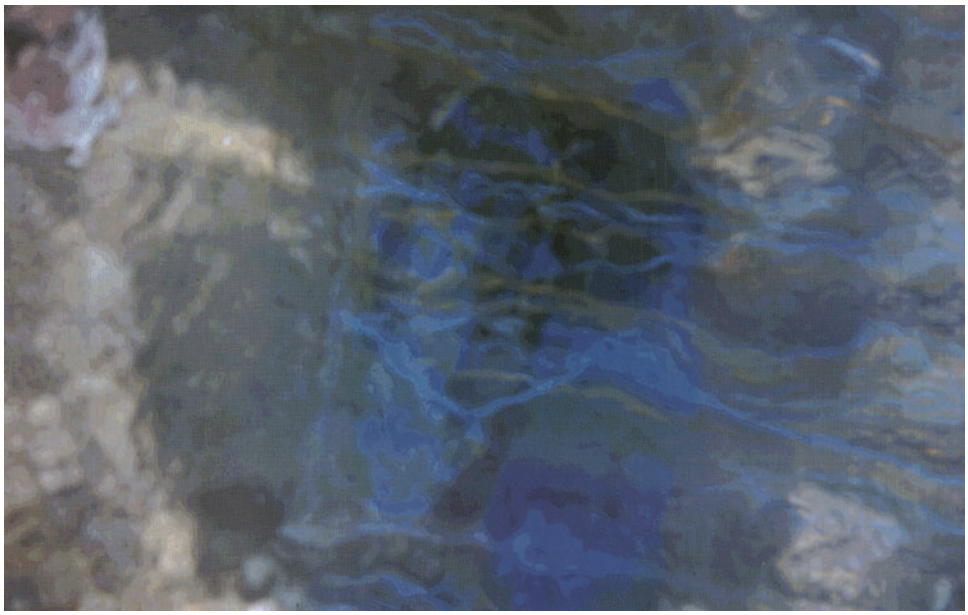

Deflection 1
70 centimeters x
100 centimeters
Drypoint/Inkjet

ARTIST STATEMENT
This work is based on artistic interpretation of sunlight deflection in shallow waters. For this purpose, I used transparent boxes with engraved and inked top covers. Inside the boxes, I put a small toy ship. I put the box in the water and took slides. Through that process, I witnessed a miracle. Effects that the naked eye could not see were captured by the camera. Through the water movement and the light deflection, the engraved and inked strict lines were transformed into colored surfaces, and the small objects' volume was also dissolved into fragments. Almost 300 slides were taken in order to capture the different optical results that correspond to each and every moment in time. Using the slides, I plotted the moments that gave me the most interesting plastic results. This combination of the natural phenomenon {the light deflection} with an artistic process that produced the engraved and inked transparent boxes created a totally new artistic phenomenon, recorded by the slides and printed digitally by plotter. This is how I respond to the challenge of renewing the thought and action involved in printing, staying close to the notion of the plate and the printed surface but at the same time enlarging the boundaries of the printing culture using the digital process of printing.

TECHNICAL STATEMENT
Staying close to the notion of the plate and the printed surface, but at the same time enlarging the boundaries of the printing culture, using the digital process of printing.

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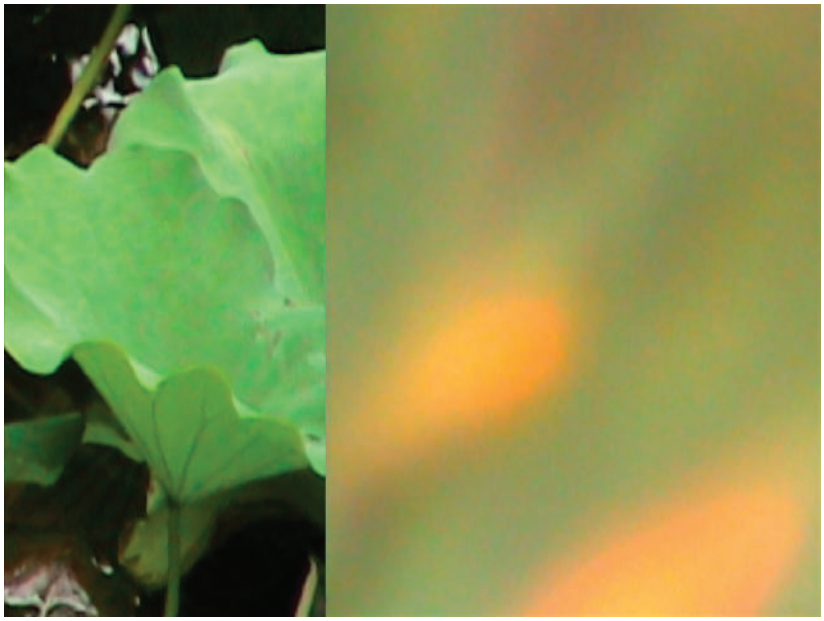

Polloi
Digital images - inkjet prints

ARTIST STATEMENT

Polloi is a series of modular prints taken from Koi, an interactive panoramic painting that investigates the relationship among the perceptual, phenomenal, and conceptual worlds. The panorama is a digital synthesis of realistic and abstract imaging from digital painting, video, and photography. It draws on art references as diverse as abstract expressionism, color-field painting, sumi ink painting, magic realism, and surrealism. It is partly derived from a series of digital photos and video taken at the Jacques Marchais Tibetan Museum.

The process I used to create each individual image was first to create the QTVR panorama, Koi, and then to use a QuickTime viewer to interactively determine the zoom factor, tilt, and pan of each composition. These individual compositions taken from the original Koi panorama were then saved as individual files and printed using an archival inkjet printer.

The *Polloi* series is modular and scalable. Each installation is selected from a series of compositions chosen in a process that mirrors the way a viewer would explore the original QTVR panorama. The number and size of the individual prints and the arrangement of the grid of prints is variable, dependent upon the specific site chosen and its aesthetic and environmental requirements. I find it aesthetically and conceptually pleasing that the process of composing an installation of prints echoes the process of creating the original panorama. Both processes are digital, although with widely varying resolutions and different, yet modular, picture elements.

TECHNICAL STATEMENT

The panorama was composed from digital imaging media, including digital painting, digital photography, and digital video. The image files were then composited in a QTVR authoring program. The final Koi panorama was used to create the many individual compositions that make up the modular and scalable *Polloi* series. Since *Polloi* is digital, it does not have a fixed size or resolution, either for the individual images or for each installation of a series of prints. Each installation of the work is site specific, determined by various environmental and aesthetic factors. The idea of resolution for each individual print image is standard (how many pixels high and how many pixels wide the image is). The resolution for an entire *Polloi* installation is similar conceptually, except that each “pixel” is an individual print. One installation might be composed of a 4 x 4 grid of prints, while the next might be a 16 x 4 grid of prints, and another might be a 32 x 1 grid (or line) of prints.

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Anthony Santoro

All This Useless Beauty
54 feet x 3 inches
Digital photography

ARTIST STATEMENT

All This Useless Beauty is a tribute to the passing of time, small sounds, and the less assertive subtleties that are hard to remember to notice during a loud and abrasive day. Created in my last year of university, this image was a study. I was curious if I could apply the same techniques used in my musical composition studies to create a piece of visual art. We were just learning Webern's serial and total control techniques, which made use of cold science, math, and logic to create music. For contrast, our music history books then reverently presented us with John Cage, the truest believer in "anything is art." This enormous image presents my best efforts to create a work that conforms to both ideals. Ratios and procedures where set up regarding how and when the images would be taken, and I left the chance elements of the composition up to the weather conditions of lower New England.

The photograph's length was created to articulate the feeling of the long and lonely walk across campus from the dormitories to the music conservatory. Growing admission throughout my course of study in the university created steep competition for the small number of practice rooms. This was a trip I made diligently, early each morning till the day of graduation.

The picture serves as a 360-degree panoramic, doubling back across the campus through an alternate route sometimes taken, only to end where it began, illustrating the days, months, and ultimately, the four years this routine repeated itself. Over 1,500 individual photographs were digitally hand sewn together to create the final piece.

TECHNICAL STATEMENT

All This Useless Beauty is a composite image made from many smaller digital photographs merged into a larger panoramic. The digital photographs were taken with an Olympus D-460 ZOOM, 1.3 Megapixel camera. Adobe Photoshop 7.0 was used to sew the images together. Once the desired walking path for the photo was established, a production schedule was created. It incorporated a timespan of over one year, so every season and time of day could be represented in the completed image. Nine photo shoots where needed to complete the task, with months built in between to process the photos and account for the possible need to reshoot any sequence. If lined up, the farthest right and left sides seamlessly join, making *All This Useless Beauty* a large 360-degree panoramic.

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Carlo Séquin

Volution's Evolution
3 related pieces,
5 inches x 5 inches
x 5 inches each
Bronze

ARTIST STATEMENT
Volution refers to a series of shell-like modular sculptural elements. Each is a constrained minimal surface embedded in a cube. The three bronze casts all have similar edge patterns on the faces of a unit cube, consisting of two quarter-circles around opposite corners, with radii equal to half the edge length of the cube. On the inside of that bounding cube, the surfaces exhibit an increasing number of saddles and tunnels, thus evolving the genus of this surface.

The simplest shape, Volution_0, is topologically equivalent to a disk. The 12 quarter-circles on the surface of the cube form a continuous, closed edge that defines the rim of this highly warped disk. Fitting the disk to this contorted edge loop results in a dramatic saddle surface with twisted canyons on either side. The bronze cast uses two subtly different patinas to make the two-sided nature of this object more apparent. In the next evolutionary step, represented by Volution_1, two central tunnels were added, lying side by side and forming a short-cut connection between pairs of ear-shaped flanges with the same surface color. In adding those tunnels, care was taken to maintain the strict D2 symmetry that is inherent to all three sculptures. Objects belonging to this symmetry group have three mutually perpendicular axes of two-fold rotational symmetry. Finally, in Volution_5, four more tunnels were added to the second shape, enhancing the genus of this surface to a value of 5. If the rim of this surface were extended and closed into a big spherical dome, the resulting surface would be topologically equivalent to a donut with five holes (or equivalently, a sphere with five handles stuck on). Again, D2 symmetry was maintained while these tunnels were added.

Each sculptural element on its own displays a remarkable variety of silhouettes, as it is laid down on different edges or stood on three of its protruding tips. The three elements together form a cohesive hyper-sculpture that gains an additional dynamic element from the increasing number of saddles and tunnels in this evolutionary sequence.

TECHNICAL STATEMENT
CAD technology was used to define and optimize the shapes of these sculptures. The geometrically significant fundamental domain of each of these symmetrical objects was first described as a simple polyhedral object that implicitly defines the intended surface connectivity and topology. These objects were then subjected to a few subdivision steps to create smooth surfaces that could be evaluated for their aesthetic appeal.

Out of more than a dozen possible shapes with different genus and different rim patterns, the most successful variations were sent to Brakke's Surface Evolver. Maintaining the rim geometry as a geometric constraint for each surface, the triangle meshes were evolved into close approximations of minimal surfaces. In nature, these surfaces would not form stable soap films in a boundary frame of corresponding geometry; the slightest disturbance of the symmetry of such a surface would make a saddle "run away" to one side and would lead to a simpler, but lopsided surface. For the surfaces of higher genus, adjacent tunnels would fight one another; the narrower tunnels would contract and pinch off. However, digital optimization on a computer allows us to maintain strict symmetry and overall balance.

The optimized meshes were then thickened to a few millimeters by creating offset surfaces on both sides of the original mathematical manifold. These solid shapes were then saved as .STL-files and sent to a Stratasys Fused Deposition Modeling machine. The three master patterns, each five inches on a side, were made from ABS plastic with this layered manufacturing technique. These plastic originals were then used in an investment-casting process, where they were burned out from a plaster-of-Paris shell and replaced with molten bronze. Steve Reinmuth was the artist who provided these bronze casts with their intriguing patinas.

Images: www.cs.berkeley.edu/~sequin/SCULPTS/VOL/

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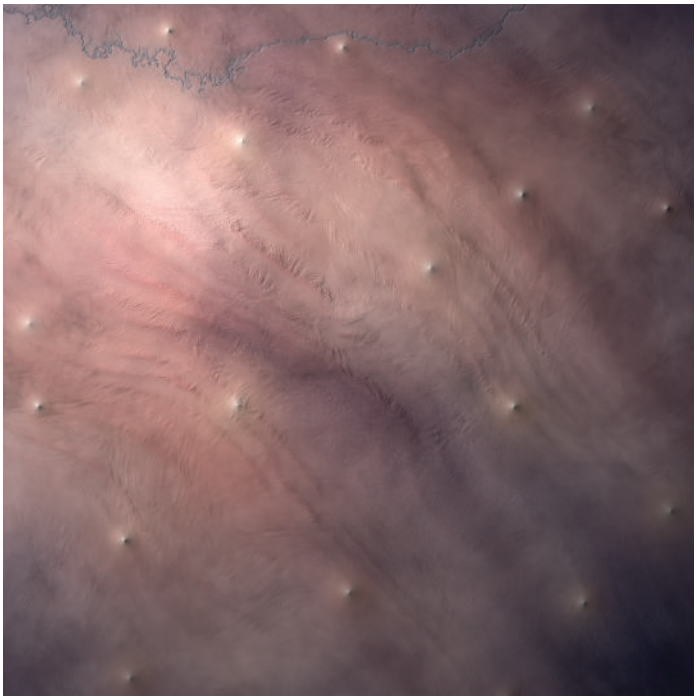

Poxville
44 inches at 15,400 pixels
x 15,400 pixels
Procedural shader

ARTIST STATEMENT
The works in this series toy with the perception of macro and micro. What seems large, resembling surface terrain, might very well be seen as minute, like microscopic gestations in a petri dish. These images are neither. They are, instead, entirely procedural entities. Each image is a 3D shader rendered on a plane, representing a "pure" world of mathematical functions, a world that is neither big nor small but somewhere else altogether, yet not entirely unfamiliar.

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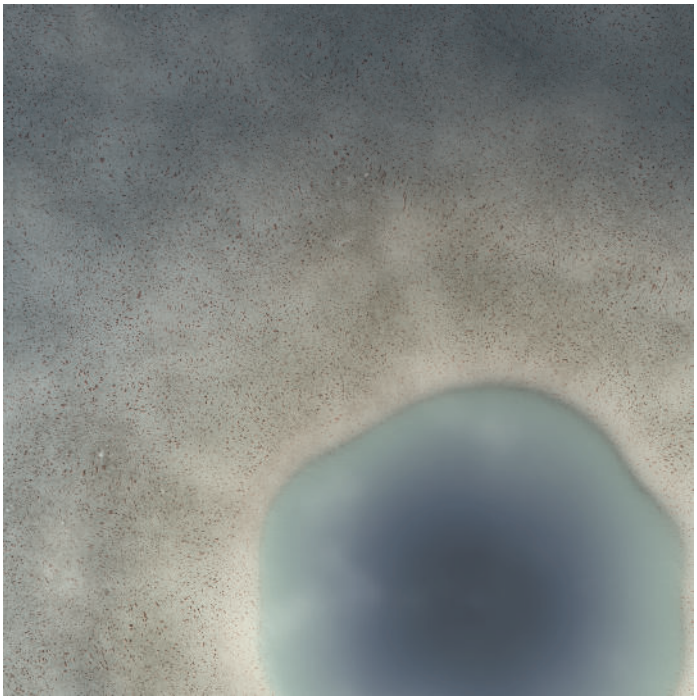

Worley Basin
44 inches at 15,400
x 15,400 pixels
Procedural shader

TECHNICAL STATEMENT
Each work in this series was created as a single procedural shader and rendered, more or less, as a shader swatch applied to a flat plane. These procedural shaders were created using Pixar's Slim, an interactive tool for shader assembly. Each shader is composed of many, many layers of simple procedural functions (like Worley and turbulence). These functions create simple, non-repeating patterns (dots, for instance) that were then painstakingly sized by manipulating surface parameterization, mapped to color and/or layer opacity, and adjusted by various other methods. Each image was built up manually with many different layers of these simple functions. No painting, digital or otherwise, was involved at any point in the process (a self-imposed constraint of this project.)

After completion, each shader was rendered directly from Slim as a glorified shader swatch, but perhaps with a larger resolution than normal: 15,400 x 15,400 pixels. The shaders displaced the surface of the plane to make bumps. The shaders were rendered with Pixar's RenderMan, and the images were not altered by any other means.

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Kathi Stertzig

kitchen sensation
150 centimeters
x 50 centimeters
Metal, textile, prints

ARTIST STATEMENT
The purpose of design is to broaden the channels of sensation and communication to experience our realities more holistically, and to make us more receptive to the various sensual experiences.

While we live in a world that has “virtual spaces” that are only based on sight and sound, we need to make sure that we do not lose “touch” with our realities.

Synaesthesia teaches us that reality has no particular form, but does have content that can be experienced in many different ways.

Multisensorial awareness has been lost from the consciousness of many people. Synaesthetes are consciously aware of their trans-modal perceptions.

My project is aimed to explore the possibilities of multisensorial perception in design – to give people the gift of synaesthesia.

How does inner-multisensorial perception influence the outer shape?

Your personal space is an expression of your identity. It is your personal interpretation of living. What do space and living environment mean for synesthetic people? Is the interaction of senses relevant for the perception of visual shapes? How do smell, taste, and sound influence form and design?

As yet, research mostly has been two-dimensional. Synaesthetic people often paint their three-dimensional visions. But what can be learned about space while there is a difference between the written, the spoken and the three-dimensional representation of the word “table?” What happens in the kitchen, where the senses melt together? What is the sound of a pan like? Observed by several synaesthetic and non-synaesthetic volunteers, I explored the perception of frying, stories, associations, sounds, tastes, and feelings. The research resulted in a series of different customised pans with what I would call alienating and surreal features. The products' use is not changed, only its common characteristic. The action of frying can be irritated by a slight change in the attributes of the product.

Sit down and perceive your perception!

TECHNICAL STATEMENT
My work derives from:
1. A video explaining synaesthesia.
2. A survey of synaesthetic women. Theme: “bakken, braten, baking” (printed book).
3. The translation of their perception in different cast-iron frying pans.

Each pan invites you to interact with your food in different ways:
- “Biting smell” – a sharp-edged pan to chop your vegetables.
- “Read the meat” – a middle-sized pan with engraved appetizing text.
- “Closer touch” – a pan in between protection and coziness.
- “Tickling hairs” – two connected gloves, to substitute for the pans' missing handles. The inside evokes special tactile sensations (material: cotton and silicone).

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Mark Stock

Red streamlines
30 inches x 30 inches
Lightjet digital print

ARTIST STATEMENT

Natural scenes contain complex patterns formed by interaction of a large number of forces acting over time and upon a great canvas. These forces can have an important and direct influence on the scene (for example, sunlight, tree branching, or waves on a lake), or they can have a subtle or indirect influence, much like atmospheric turbulence, nutrient diffusion in the soil, or the combined actions of insects and small animals. When these varied forces interact, they create structures and patterns in sight and sound that are more complicated than any single force could itself create.

From this interplay of great numbers of forces come the sensations that are the cornerstone of humans' perception of beauty. The aim of my work is to untangle this convolution by separating the underlying forces and processes from their earthly manifestations. Only when studied individually or in small numbers can their own influence on our perceptions be revealed. Landscape photographers attempt this when they isolate features such as sand dunes, slot canyons, or leaf piles in their images. Computers have opened the door to even deeper exploration, allowing us to separate and recombine the multiple forces involved in those, and other, scenes. Exploration of these minimal sets of elementary co-acting forces creates images that resemble no naturally occurring scene, yet still evoke a feeling of familiarity or a perception of beauty.

Red streamlines investigates the essential character of wavy, rotation-dominated flow. Low-speed fluid motion (the kind with which we are innately familiar) can be described most compactly by its rotational component. The influence that the rotationality has on the flow drops off in relation to the distance squared, much like many other important processes in nature. Thus, shapes common to wavy flows can be seen not only in air and water, but in landforms as well.

A common element in most of my work is the interreflection of light throughout a scene, and this piece is no exception. Including this effect in an image gives virtual objects context and ties different parts of a scene together. Computing this interplay of light and shadow is no small task, but it lends believability to a scene, no matter how unphysical the objects in it may be. If the viewer can focus on the object itself, and not be distracted by its artificiality, communicating its form and shape is most effective.

TECHNICAL STATEMENT

As with all of my work, computers assisted or wholly performed the many steps involved in the creation of *Red streamlines*. The image itself is of 1,000 streamlines in a fluid-like flow. Their paths are determined by tracking particles as they move through a field full of vortex blobs, each imparting a motion to the particles. A fast algorithm was used to sum the individual influences and compute the paths. The Radiance Synthetic Imaging System rendered the final scene at a very high resolution and used an under-sampled global illumination method to calculate the effects of light interreflection.

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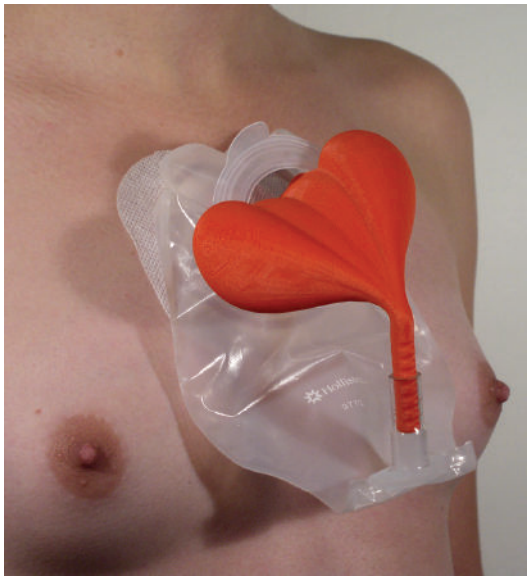

Written Brooch
5.2 inches x 4.5 inches x 4.7 inches
FDM ABS plastic, medical adhesive

ARTIST STATEMENT

Written Brooch is about vacillation. It is based on a leaf I observed that was caught by its stem on the carpet of a front porch dusted with snow. As the wind blew, the leaf revolved around itself, drawing where it had been and where it was going over and over again. This piece refers to the decision-making process and how changing one's mind often creates a cyclical pattern of events.

My recent work is a continuing investigation of the ways wearable objects interact with body surfaces. While I have investigated different types of wearable objects, my current work consists of brooches. Using a variety of medical adhesives and wound-treatment devices, I create brooches that are applied directly to the skin. The adhesives provide an armature that accepts and supports the objects I create via CAD and rapid prototyping.

While drawing inspiration from the female body, as well as other forms seen in nature, it is my intention to create hybrid organic forms that resist direct identification. Eliminating clothing as the attaching surface, I ask the viewer/wearer to see the brooch in the context of the naked female form, as well as let go of their preconceived notions of what jewelry is or needs to be.

This new relationship challenges societal views of adorning oneself both through the placement of the object and the value of the material. Through my work, I redefine what can be considered jewelry and, more importantly, which jewelry can be considered art. I believe that art should exist to inform the viewer. When these brootches are worn, they create a dramatic tension, because they are placed intimately on the skin, adhering and adapting to the surface of the body.

TECHNICAL STATEMENT

My involvement with the computer as a medium has allowed me the freedom to design objects that I could not create by traditional means. This involvement in technology has given me the opportunity to embrace various fields outside of art and craft. Every aspect of each piece is created and conceptualized within the virtual building environment of a CAD application. I also recreate the medical devices, to scale, within this environment so I can build directly onto them. This virtual "fit test" allows me to create unique fluid transitions from the adhesive to the brooch. When the brooch has been completed within the CAD application, it is realized tangibly through the use of rapid prototyping technologies. My recent self-adhering brooch series is built using fused deposition modeling, an additive process that builds ABS plastic layer by layer.

For the first time, I am taking advantage of color prototypes. My recent work has departed from the default "white" material and is now composed of a brilliant primary red.

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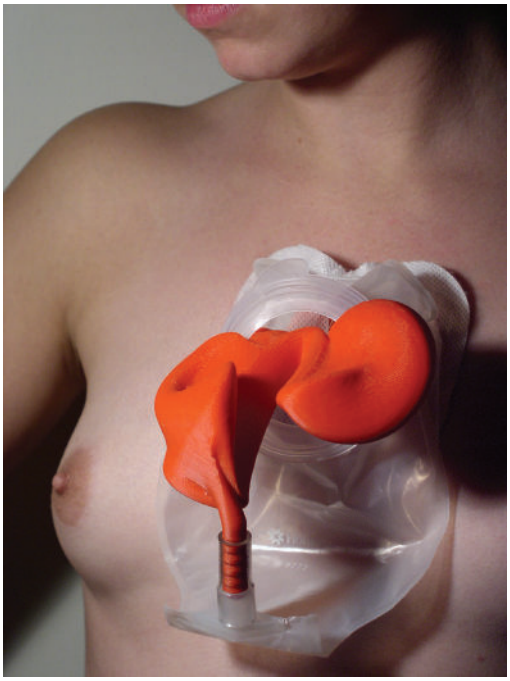

Split Brooch
5.2 inches x 5.1 inches x 4.7 inches
FDM ABS plastic, medical adhesive

ARTIST STATEMENT

Split Brooch is a piece about losing part of oneself in the absence of another. When, through conscience decision making, people no longer play an integral role in our lives there is an acute sense of void within daily activity. *Split Brooch* represents that crack in the everyday and the re-growth of the new that builds in its emptiness.

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Noise Control
26 inches x 30 inches
VAX, Fortran, IGL, photo-silkscreen, photolithograph, COM recorder, scanner, and PPC

ARTIST STATEMENT
Acutely aware of order, I try to examine what technological and human worlds have in common. Natural order, revealed randomly and regularly, infuses several levels of both worlds: some determined by humans, through buildings, windows, even cars parked in lots, and some determined by nature, through trees, branches, and leaves.

Natural order guides our understanding of big datasets related to network analysis, when we employ physical analogies of the data, render the data graphically, explore them “by eye” and interact in real time.

My task is to juxtapose the regularity of nature with human constructions, both physical and intellectual. The big city, for example, combines how humans affect their environment and how a city metaphor reflects rhythm and organization of big datasets, and makes data mining easier. Observers – whether artists or technology experts – perceive such relationships in different lights and from different perspectives and different points of view.

Processes in nature and events in technologies inspire my images. Such processes also support my instruction in computer art and graphics, where students learn to create artwork and demonstrate what they understand of scientific concepts.

Noise Control

You worked all your life
to keep silence safe from noise.
The quieter it’s here
the less renowned you are.

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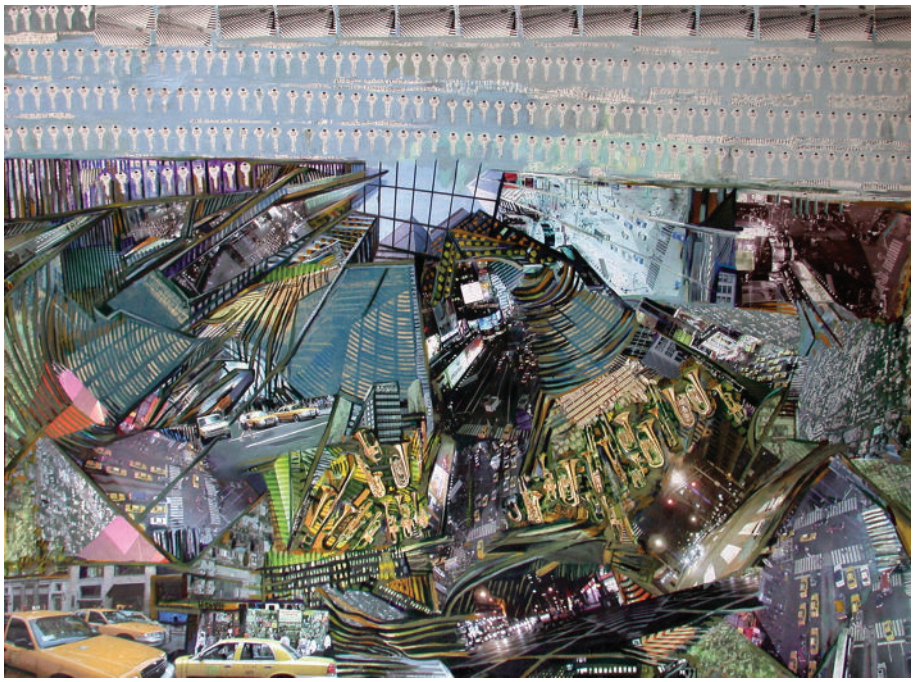
Anna Ursyn



Pitch and Volume
24 inches x 32 inches
VAX, Fortran, IGL, photosilkscreen, photolithograph, COM recorder, scanner, and PPC

TECHNICAL STATEMENT
Typically, my creation of art runs through stages. First, I sketch a general outline for the bigger composition, then I draw abstract geometric designs as starting points for executing my computer programs. Computers then convert my ideas into lines, with codes taking shape as iconic images of animals (a horse, for example) or symbolic images of humans (a warrior, for example).

Some of my projects are two-dimensional; others are three-dimensional, depending on my composition's final dictates. Programmed data flow electronically into the final artwork.

To vary color combinations, I convert computer printouts into photo silkscreens, for WYSIWYG, and photo lithographs, for reversed images. Then I add painterly markings to finish the composition.

To compose, I use repetition of lines, shapes, and forms; select color combinations; transform light intensity; apply grid patterns and moiré effects. To ensure unity, the computer's memory regroups recurrent elements, contrasting order and chaos.

Computer programs shape my wooden and mixed-media sculptures. The wireframed designs of 3D guide construction while images – multiplied, superimposed, transported – offer illusions of time and movement.

I create programs in Fortran 77 to repeat lines and transform, distort, and manipulate images by scaling, rotating, slanting, and changing perspective. Then I add photographic content using scanners and digital cameras.

Pitch and Volume

Let's listen to the city music.
Pitch our voices in key with others
without confusion of tongues and meaning.
Let's hum a tune and rejoice in laugh
when we stay set in a traffic jam.

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Eva Verhoeven

Audio Printer
90 centimeters x 80 centimeters x 190 centimeters
Computer, printer, amplifier, and speakers

ARTIST STATEMENT
The project's main purpose is to explore strategies in the field of media art that enable a critical understanding of the medium that is being used and thus critically reflect upon the computer as a medium. In order to investigate these questions and issues, I explored strategies like instructions, appropriation, and intervention in the everyday that were developed in the context of art by the avant-garde of the 1950s and 1960s, in particular.

John Cage's work on Prepared Piano Music has been of particular interest. In 1940, Cage prepared the strings of a piano with screws. This led not only to alteration of the medium, but also the need to change the visual character and contents of the score. On the level of the programme, or the score and the hardware, or the instrument, Cage appropriated and intervened in the conventional conception of the instrument.

I began exploring the hardware itself, trying to find ways to intervene and lay open the structures of the computer as a symbolic system. The installation *Audio Printer* emerged from this research. Documents that are sent to the printer can be heard as the sounds of the data. The data on the level of the binary system represent the document, and it becomes visible and accessible though its own production of sound. The underlying structures are conceptually made visible or audible.

TECHNICAL STATEMENT
Computers work with signs and symbols. In other words, they work with different structures of representation. The computer operates with little bursts of electricity (only about five volts) that correspond to the on-and-off, or zero-and-one, states of the binary system. These electric pulses are, generally speaking, translated into assembly codes and machine languages, which are further translated into sets of instructions and finally into a language that the user can understand. This representation appears to the user as an operating system and application software.

With the aim of exploring these underlying structures, I started to have a look at the parallel port as an output device that is usually used to connect a printer. The parallel port sends bits of data across eight parallel wires in the form of voltages. To represent a 1 in the binary system, approximately five volts are sent through, and for zero, a nearly zero voltage is transmitted, to signify 0 in the binary system. The data are loaded and sent through on lines 2 to 9. The next step was to connect an amplifier and speaker to the lines that load the data. By linking transformers in between the parallel cable and the amplifier, five volts turned out to be efficient to hear the data streams. The information from the document that is sent to the printer, passing through several layers of representation and being translated into several different languages, becomes data sound.

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Roman Verostko

Twenty-Six Visions of Hildegarde
25 inches x 33 inches
Pen-and-ink drawing on paper
with gold leaf enhancement.

ARTIST STATEMENT

My work emerges from the tradition of early 20th-century pioneers who sought to create pure form. Such forms, as found in the work of artists like Kasimir Malevich, Piet Mondrian, Wassily Kandinsky, and Barbara Hepworth, became the focus of my own work in the late 1950s. Since then, in all my work, I have sought to create original forms that are unique realities in and of themselves without reference to other objects or images.

With the advent of computers, I eventually found myself experimenting with coded procedures, "algorithms," that mimed some of the methods I used in creating my art forms. Seeing the awesome power of recursive drawing, I became fully committed to developing a program of procedures based on my practice as a painter. In my current work, all forms are generated with original algorithms. The forms do not refer to other realities; rather, they are realities in and of themselves.

Titles

Titles for specific works or a series of works are usually derived from an evocative quality or association I find in the work. Often my works are simply given a composition or series number. The works, therefore, do not refer to events, ideas, objects, or subjects. They are objects to be experienced for their visual form similar to the way one might experience a musical form.

Meanings

For me these forms are visual celebrations of information-processing procedures embedded in today's culture. The works are visual analogues of the coded procedures by which they were generated. They invite us to ponder how the stark logic of a coded procedure yields such surprising grace and beauty. By doing so, they serve as icons, illuminating the mysterious nature of code, the procedures underlying the shape of our evolving selves.

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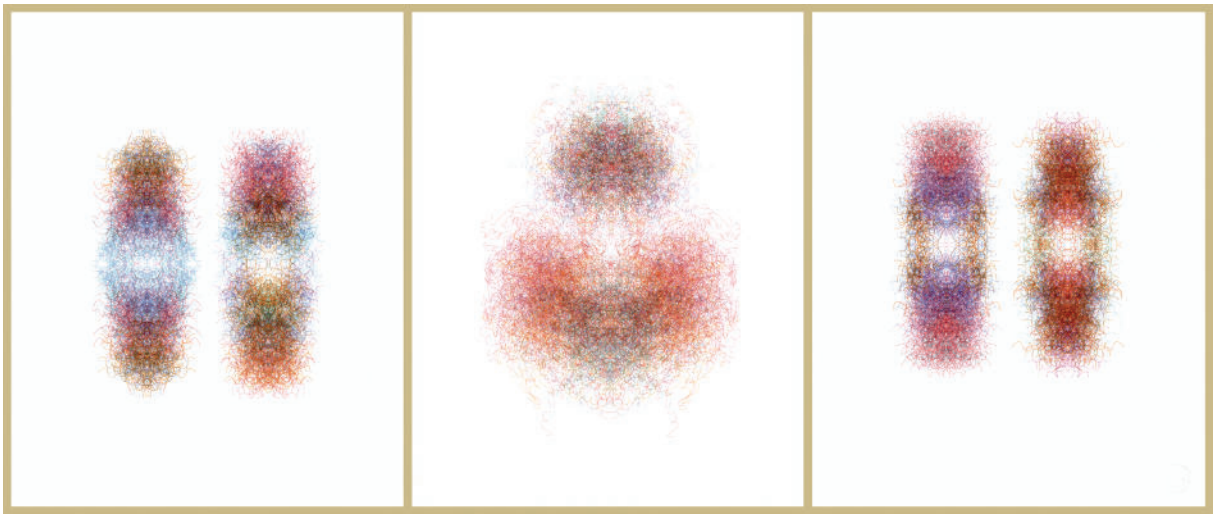

Gaia Triptych
16 inches x 36 inches
Pen-and-ink drawing on paper

TECHNICAL STATEMENT

For over 20 years, I have been working on a program of form generators for initiating and improvising art-form ideas. These generators are original drawing instructions (algorithms) that specify detailed procedures for visualizing form. With these generators, I explore form possibilities, make choices, refine forms, and compose a procedure for creating each work of art. The finished work is drawn with ink pens mounted on the drawing arm of a pen plotter. Controlling algorithms for all procedures are under continuing development in a program of routines I have titled “Hodos.”

Materials

Most of my algorithmic works are original pen-and-ink drawings on rag paper. Technical pens with refillable inkwells that contain permanent acrylic inks execute the drawings. Since the 1980s, all drawings have been executed with Houston Instruments multi-pen plotters coupled to PCs. Currently, I am using HI 7000 machines coupled to PCs operating on DOS. Note that some works do include occasional brush strokes. In those instances, brushes were mounted on the plotter’s drawing arm in lieu of ink pens.

The Code

My software is written in elementary BASIC with DMPL as the command language for driving the plotter. Historical routines dating back to the 1980s can be called on from the controlling program. A new work could be created today with routines dating from the 1980s. Some works now have two dates, the original algorithm date and the date of execution.

Technique

As an artist, I have always placed great value on technique. Elementary pen-plotting tools and simple programming procedures have provided me with more challenges than I can exhaust in my lifetime. After more than 40 years and thousands of drawings, I have learned a lot about ink viscosities, pigments, paper surfaces, honing pen tips, and writing software fixes. Yet I feel like I have only begun to explore the art of drawing with pen and paper.

More on my theory and practice at: www.penplot.com

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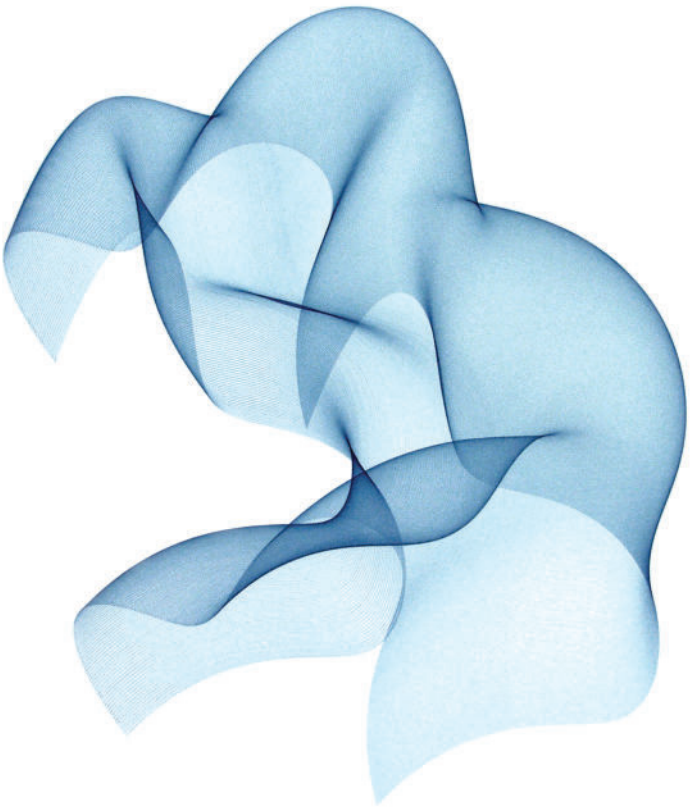

Cyberflower # VII
26 inches x 32 inches
Pen-and-ink drawing on paper

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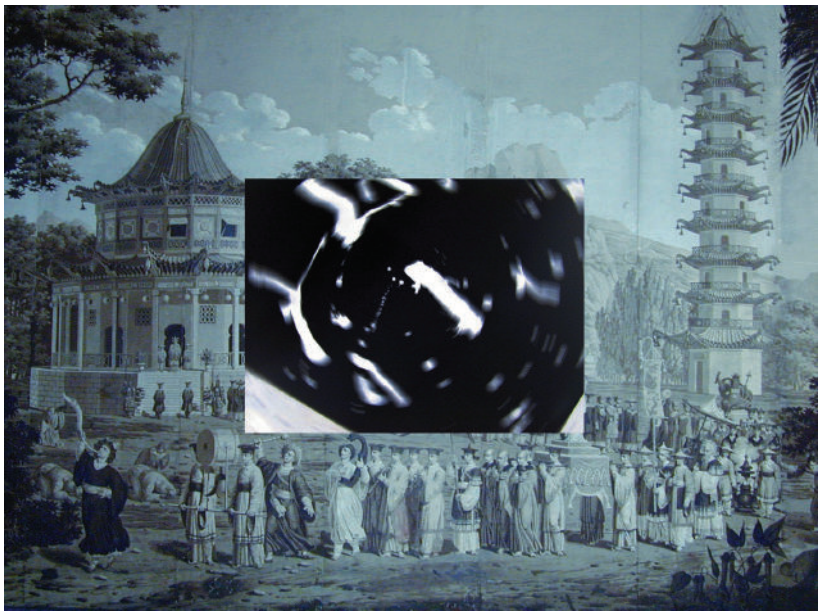
James Faure Walker



The Song of the Revolving Drawing
23 inches x 30 inches
Giclee inkjet print

ARTIST STATEMENT
This picture happened more or less by chance. I photographed the background in a wallpaper museum in Germany. It is painted in gouache on newspaper, a virtuoso piece of 18th-century chinoiserie by a German artist. I had also been speculating about drawing and movement. Put simply, just about every kind of drawing you can think of involves either the movement of brush or pencil, the implication, or the depiction of movement. I was thinking about running past drawings, seeing them blurred. In this case I was interested in spinning drawings, making drawings that had to be seen as they rotated. Here the drawing is shown in negative. I realised, too, that the ceremony shown on the wallpaper would be the perfect setting for this little event.

TECHNICAL STATEMENT
The background is photographed. The central drawing is gouache, painted fast, and photographed by a turning camera.

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James Faure Walker

Frog, Greenwood Road
24 inches x 24 inches
Giclee inkjet print

ARTIST STATEMENT

In our London back garden, we are lucky each summer to have two resident frogs. I tried this image out on a variety of backgrounds before settling on this one, which I think of as having a slight art nouveau feel to it. Some of the physical drawing is done with sticks in both left and right hands, and some of the digital drawing is done in vector format, so there are several contrasting methods at work. What fascinates me about some images is what they tell you about the position of the observer, and in this case the intimate overhead view of the frog is combined with an implicit landscape elevation.

TECHNICAL STATEMENT

The line drawing here is a fusion of various digital and physical methods, each with their own constraints. The frog photograph is reduced to three colours.

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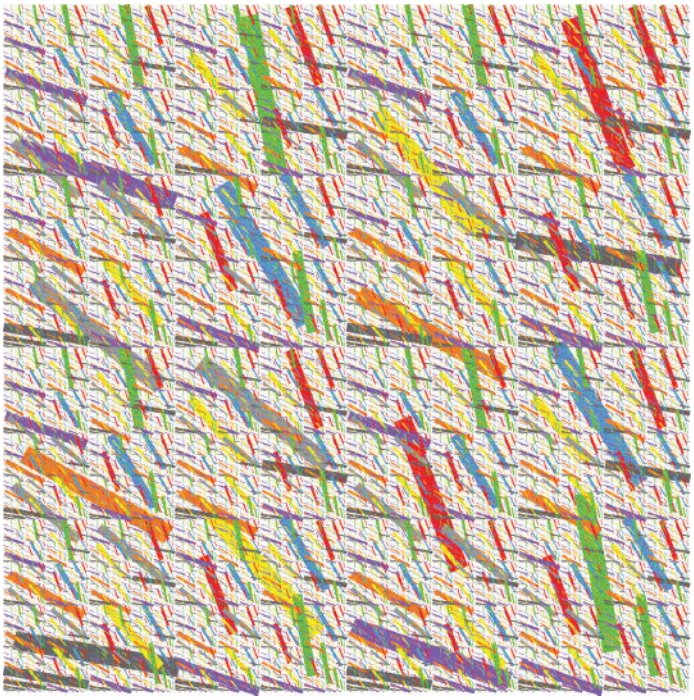
Philip Wetton



ziggi1
23 inches x 24 inches
Giclee print

ARTIST STATEMENT
I had been making traditional prints for 30 years when I was introduced to digital imaging. My attitude toward images and image making has been dramatically changed. The possibilities are infinite ...

TECHNICAL STATEMENT
Image produced using Adobe Illustrator. Printed on Epson Stylus Pro 7600 with Ultra Chrome inks on Sumerset Velvet.

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David Crawford

Stop Motion Studies - Tokyo

ARTIST STATEMENT
www.stopmotionstudies.net

"Stop Motion Studies" is a series of experimental documentaries that chronicle my interaction with subway passengers in cities around the world. The aim of the project is to create an international character study based on the aspects of identity that emerge.

It is said that 90 percent of human communication is non-verbal. In these photographs, the body language of the subjects becomes the basic syntax for a series of web-based animations exploring movement, gesture, and algorithmic montage. Many sequences document a person's reaction to being photographed by a stranger. Some smile, others snarl, still others perform. Some pretend not to notice. Underneath all of this are assumptions and unknowns unique to each situation.

The series extends my long-standing interest in narrative and, in particular, looks at the subway as a stage upon which social dynamics and individual behavior are increasingly mediated by digital technology. As one of the most vibrant and egalitarian networks in our cities, subways bring people from a wide range of social and cultural backgrounds into close contact. This process plays a significant role in shaping both the character of a city and our individual identities.

TECHNICAL STATEMENT
At its heart, the project celebrates what can be accomplished within the file-size constraints presented by current network architectures. Flash MX is used as both sequencer and streaming technology for what might be referred to as "poor-man's video." In any case, the experience is rich while being specific to the online environment. As it is interactive and non-hierarchical, the project functions more like a simulation with dramatic overtones than a linear narrative. Users simulate the act of riding in the subway, a transportation network that provides an allegory for the ebb and flow of information that is the traffic of the internet.

The target audience is both PC and Mac users with a screen resolution of 800 x 600 or higher and a color depth of at least 8 bits (256 colors). A web browser of version 5.0 or greater is required, either Netscape Navigator or Internet Explorer. The Flash plug-in (version 6.0 or higher) is also necessary. Roughly 80 percent of users will be able to view the project without making any adjustments to their current hardware or software configurations. File sizes will be optimized so that users can access the project over a 56K modem.

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Scott Draves

ARTIST STATEMENT
I am a software artist schooled in computer science and mathematics, living in the San Francisco Bay Area. I produce visuals by writing software. The end products of my work include digital prints, video, interactive systems, and web sites. The software has emergent properties, exhibits artificial life, and is distributed with an open-source license. The graphics are abstract, sensuous, introspective, and emotive. The style is organic rather than geometric.

My work consumes a large part of my life, and hence it has many dimensions and intentions. Primarily, it is simply to create beauty. It validates the premise of a-life: that beauty and life can spring from iteration of simple mechanical rules. You can get out more than what you put in. It validates the open-source model and repudiates the theory that artificial scarcity is necessary for art to have value. The intent of my work is to show that creation does not require control, and, in fact, giving up control is the primary creative act.

Ultimately, I hope to participate in filling cyberspace with beauty and awareness: to imminetize the eschaton.

TECHNICAL STATEMENT
Electric Sheep realizes the collective dream of sleeping computers from all over the internet. It's a distributed screen saver that harnesses idle computers into a render farm with the purpose of animating and evolving artificial life forms. The project is an attention vortex. It illustrates the process by which the longer and closer one studies something, the more detail and structure appears.

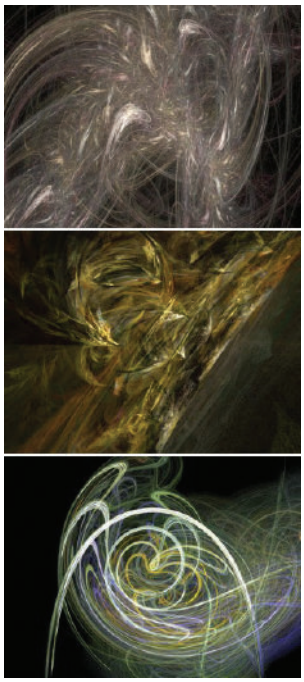
When the software is activated, the screen goes black, and an animated "sheep" appears. In parallel, the screen-saver client connects to a P2P network and joins the distributed computation of new sheep.

The screen saver is a window into a visual space shared among all users. Each sheep is about four seconds long and is the phenotype of an artificial organism, an "electric sheep." The animations loop and dovetail with each other, forming a random graph. The client displays them one after another in a continuous, ever-changing sequence.

The fitness function for their evolution is determined by the collective voting of the thousands of users.

Not only is the rendering shared, but so is the bandwidth load of distributing the animations. The gnutella P2P network is used for both the heavy lifting of MPEG sharing and for calculating the aesthetic selection function.

Electric Sheep investigates the role of experiencers in creating the experience. If nobody ran the client, there would be nothing to see.



Electric Sheep

The sheep system exhibits increasing returns on each of its levels. As more clients join, more computational muscle becomes available, and the resolution of the graphics may be increased by making the sheep longer, larger, or sharper. The more people participate, the better the graphics look.

Likewise, as developers focus more of their attention on the source code, the client and server themselves become more efficient, grow new features, and are ported into new habitats. The project gains momentum and attracts more developers.

And as more users vote for their favorite sheep, the evolutionary algorithm more quickly distills randomness into eye candy.

I believe the free flow of code is an increasingly important social and artistic force. The proliferation of powerful computers with high-bandwidth network connections forms the substrate of an expanding universe. The electric sheep and we, their shepherds, are colonizing this new frontier.

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Leif Codices

ARTIST STATEMENT
Leif Codices consists of two sections:

1. "Landscape" takes the viewer through a sequence of online animations that employ fragmented browser display and user activation as their main formal features. Landscape is understood in terms both personal and political. The Pollen Station window hides a sequence of pollen windows (I understand pollen as analogous to minute invisible emotional units). The Go window activates the Propaganda Panorama, which refers to the construction of reality with a view to the recent war.

2. "Library," by contrast, is a mere container for a series of artist eBooks: Pollen Connection Point, Border Patrol, Party Turnstile, Conflict Mountain, O[clk]tober, Road Works, and Equilibrium Panel. With the exception of O[clk]tober (an online diary of images collected from web sites that are daily updated and linked to news sites across the world), these books are available for download and off-line viewing. Their often complex structures merge abstract form and literal images in an idiosyncratic investigation into possible meanings of landscape, from the personally obscure to the politically obvious.

Both eBooks and the online structure share formal aspects, and, in some cases, also imagery. One is reflecting on the other. The eBooks can be owned by the user; the structure is available only online. The work is a mainly self-contained structure. Only its links from the Ocktober HTML-eBook provide a connection to the everyday world presented through the internet.

This work was made possible through an AHRB Research Fellowship at Newcastle University.

TECHNICAL STATEMENT
The online structure is best viewed on Internet Explorer 5+ and requires a Flash 5 plug-in. It works best with a fast connection.

The eBooks require Acrobat Reader 5+. Except for two of the eBooks, they are for Macintosh only. Acrobat Reader for Windows does not open the sub-books in new windows as the Macintosh Reader does. Each book is a small application in itself.

The work was conceived as a sculptural online work in which the small windows are placed like objects in a space. It uses Javascripted windows in conjunction with Flash animation. There are three different versions to accommodate three different screen sizes. For its graphical appearance, "Landscape" is intentionally making use of the browser's capability to use several display windows at the same time in order to show its possibilities compared to video art. It is also an alternative proposition for use of the usual browser interface.

The eBooks are both linear and non-linear structures: the user can simply use the arrow-buttons on the keyboard to browse through the books or discover hidden links within the pages. Pollen Connection Point, Border Patrol, Party Turnstile, and Road Works also contain sub-books and parallel books for the user to discover, whereas Conflict Mountain and Equilibrium Panel only have one image sequence. Each work employs PDF technology with Javascript to create a new form of electronic book (or book in general), that can also be printed out as a picture series. Each, with the exception of O[clk]tober, is a self-contained, computer-based work of art. O[clk]tober displays images in small individual browser windows that provide links to the contemporary world of news information: the main source of literal imagery throughout *Leif Codices*.

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ARTIST STATEMENT
Six virtual biomorphic sculptures that entertain and intrigue the viewer by provoking instinctive reactions that encourage the desire to explore further.

Moving away from mechanical (motor-based, mobile, and clockwork) kinetic sculpture, the series develops kinetic rhythms and dynamism within virtual biomorphic sculptures.

Metamorphosis explores form, space, motion, material, and sound, and how these combine to affect how people perceive and believe what they see. It is the combination of these elements that make up the material of the object. Material defines how the object looks, moves, and feels to the observer.

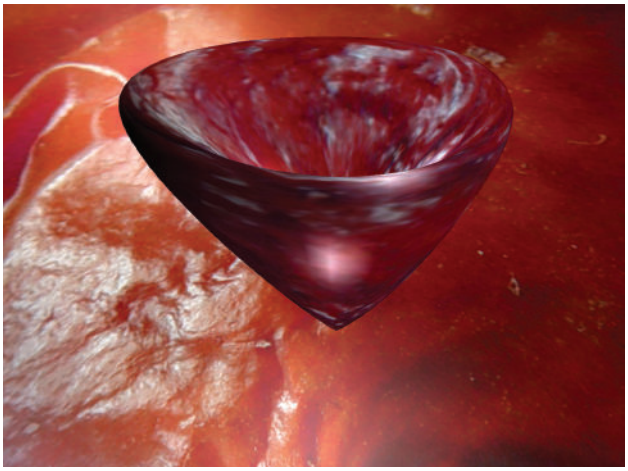
Each of the six sculptures morphs between two alternate states, in different ways, due to their differing physical properties. Each movement emits a sound that reinforces the real-life credibility of these imaginary creations.

The motion or rhythm of the series is bipolar by nature, with alternating forms dependent on time, ranging from almost pendulum-like regularity to sporadic intermittent pulses. The pause between the metamorphoses can lead to a sense of anticipation, and the lack of regularity keeps the viewer guessing.

This work introduces a new medium, “digital clay,” which can bring a traditionally static art form to life through programmable physical properties.

Consciously and subconsciously, motion and material are combined to form a conclusion as to what the sculpture is. Viewers try to categorise what they see. The clues are in the colours, movements, and sounds of the objects. You don't have to make a decision as to what the object is, but you get a real feeling for what the object is about.

The sculptures are not abstractions of human, animal, or organic forms, but creations of geometric origin; however, they have the essence of the organic, inorganic, and mechanical. The mix of the surreal with the essence of real substances is reassuringly familiar, but it challenges the audience's perception. These sculptures cannot be physically touched, yet they prompt individual emotional response. It is this response that makes the sculptures believable to the observer.



Metamorphosis

TECHNICAL STATEMENT
Metamorphosis consists of one basic form: a sphere. The sphere, in 3D computer graphics terms, is actually a many-sided shape, a polyhedron. The *Metamorphosis* sphere consists of about 2,000 sides. There are six different sculptures created from this one sphere that has been mathematically distorted. Combinations of equations with varying parameters were used to alter the positions of the points (vertices) that the sides connect to.

Each of the six sculptures, in fact, has two different forms, and they alternate between these two states, according to timed triggers. As well as different positions, each vertex has the physical properties of friction and elasticity. Together, these force the shape to oscillate between its two states. The sculptures with greater friction move slowly, as if viscous in material, and the forms with greater elasticity swing wildly around, as if they are full of energy.

The physical properties and vertex manipulation are also combined with graphical representation and sound. The graphics are abstract in nature, like the sculptures. and demonstrate how the colour and texture affect the viewer's perception of each sculpture's physical properties. They are created to reinforce the forms. Sound is used, too, to strengthen the feel of the sculptures

The physicality of the scupltures is explored using your body as a control device. Moving your arms allows you to look around and inside them. Because they are reactive objects, you can interact by punching dents into them. How they react will depend on the physical settings that are materially inherent in the sculptures. They might spring back or slowly reshape themselves. You might even consider these sculptures to be living.

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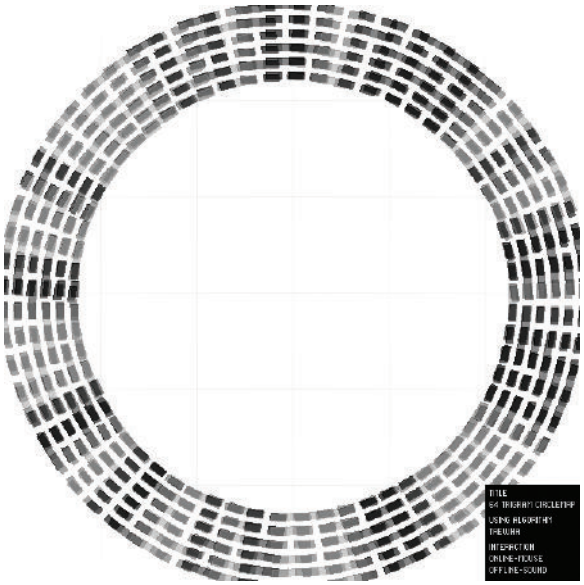

Number in I-Ching

ARTIST STATEMENT
This project studies the connection between Oriental philosophy and digital media. After an in-depth analysis of the underlying philosophy and logic of the I-Ching, the project sought to attach media factors (sound, shape, color, divination) to the I-Ching's structure.

TECHNICAL STATEMENT
The literary production was studied in three phases. In the first phase, a demonstration model was produced to understand the algorithm and confirm whether the algorithm of I-Ching philosophy can be visualized. In the second phase, we developed an art algorithm based on the digital media and confirmed it by applying the algorithm of I-Ching philosophy and developing the various typed expressions. In the third phase, we developed and confirmed the iteration of the I-Ching-based media presentation tool, through visualizing a boundless interrelationship among various media factors assigned to five primary substances by algorithm and producing a tool for users to control and express the media factors and the I-Ching algorithm simultaneously.

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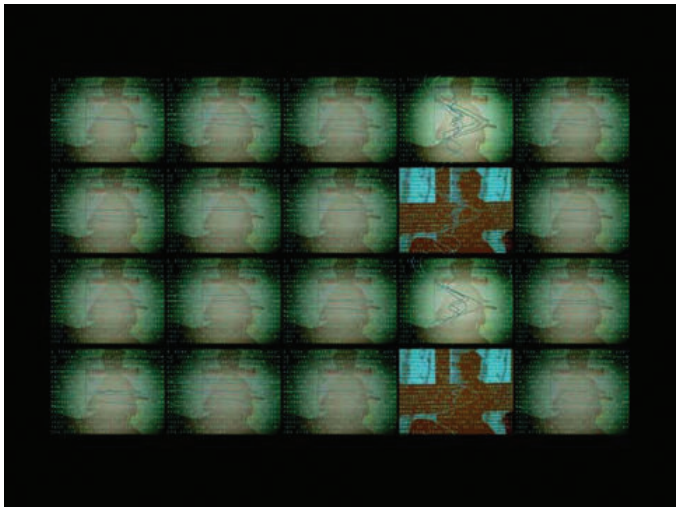

Views from the ground floor ...

ARTIST STATEMENT
www.viewsfromthegroundfloor.com

Jess Loseby is an established net and digital artist from the UK. Her primary medium is the internet. She exhibits in national and international projects both online and offline. Her work ranges from small and intimate online installations to large-scale digital projections and video. Loseby's unashamedly low-tech net installations and video build comparisons of the network and digitality into their frustrations, attention to triviality, and repetition as absurdly compatible to the female domestic routine. Themes dealing with individuality and cyber identity reoccur frequently, as do the faces of her children, who seem to be bound up irrevocably with her digital self. Jess Loseby is young(ish), has three children, one husband, and no time!

"Views from the ground floor ..." *views [view, see, perceive] point of view, physical height, opinion, point of view, [opportunity for] to see, as seen from a particular place, distinctiveness of vision, under observation from a place or [stand]point [in view] to consider or judge or foreseen [ground] lower, floor level, domestic or single-story [story] trivial lower base.*

Views from the ground floor ... is a networked installation, a view of a pixilated domestic landscape that can seem in one scene utopian and in another transformed into a constricted area full of suppressed fears and desires. Loseby draws unexpected and compelling comparisons between female domesticity and cyber culture; where low and high technology live side-by-side in an uneasy partnership of repetition, interaction, and consequences. Her positioning as a wheelchair-user means these visions are always viewed from the ground floor ...

Views from the ground floor ... was made with the generous support of the Daniel Langlois Foundation.

TECHNICAL STATEMENT
Flash 6 plug-in
Soundcard and speakers
Internet Explorer 5+
Broadband or ISDN connection recommended

The digital technology involved in the making of *Views from the ground floor ...* is compatible with Loseby's ideas of hi-tec/lo-tec synergy. The work was created using a home PC, DV cam, and a range of "off-the-shelf" software and (domestic) tech. However, its utilization of the internet as the primary medium creates a linear/non-linear and unique narrative, which is arguably only possible on the net. Aspects of the net are deliberately employed in the production of the piece, from page-loading hierarchies to using "bugs" in both Internet Explorer and Flash to visually affect the work. Multiple Flash movies are repeatedly embedded into the HTML pages (disrupting the corporate rectangle) and video. Gifs and texts are layered over and above static icons in a style perhaps closer to mixed media or montage than the web.

Clive Loseby, a composer more known for his work in film and television, wrote the music for the piece. Polished, studio-based music created in a high-technology environment was then deliberately mixed (collaboratively), using manual and lo-tec techniques and DV-cam-recorded domestic sounds and samples, to create a fragile and wishful audio narrative that supports the visuals.

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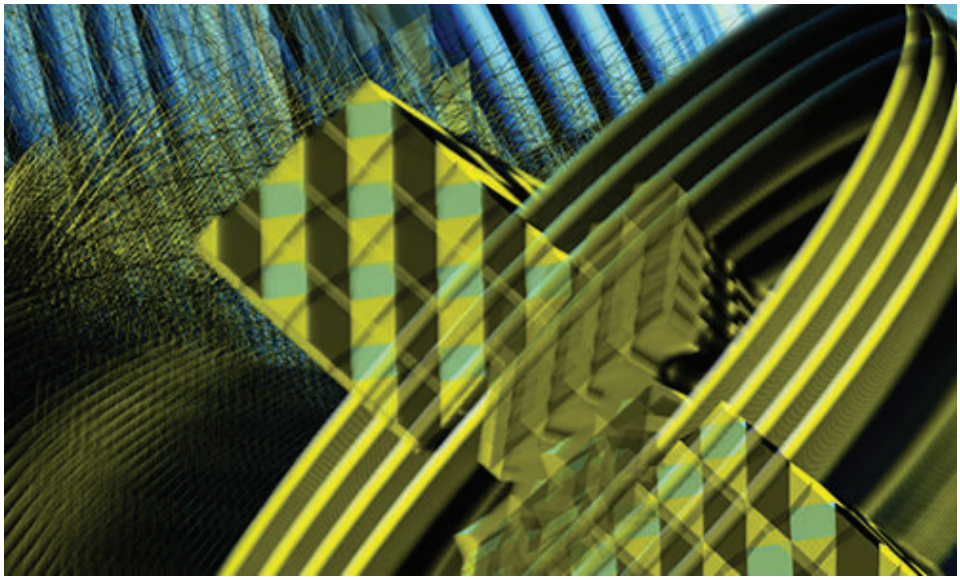

Virtual and Real: K-Dron and Light

ARTIST STATEMENT
My principal interest is to create artworks that incorporate visual, audio, and interaction design aspects with elements of surprise or randomness. I treat programming languages and computer hardware as means of expressing myself and of exploring technical possibilities. The design of interaction is especially important to me, because it evokes a physical and intellectual reaction from viewers, engaging them in a creative dialog with my artwork. This dialog sets a stage to confront my own ideas with those of viewers. It often transforms my artwork into creations beyond my own expectations, empowering viewers' own creative capabilities.

TECHNICAL STATEMENT
Virtual & Real: K-Dron and Light is the first project from my new series, *Virtual & Real*. It was inspired by Janusz Kapusta's K-Dron shape and its luminous properties when stimulated by light. The project connects the viewer with a virtual space through interaction of a mouse and a virtual light in a three-dimensional, digital environment composed of K-Dron walls. The combinations of K-Drons and light evoke unique, mosaic-like images, which, as they leave traces of color, create an ever-changing, spontaneous, and abstract blend of two- and three-dimensional compositions.

Instructions
Your mouse is directly connected to a virtual light and sound in the world of K-Drons. Slowly move the mouse left and right to change the position of the light and move it quickly to trigger various animations and patterns of the K-Dron walls. Technical requirements: at least 32MB 3D graphics card, Pentium 4 processor, and Shockwave player.

This project was made possible in part by grants from the New York State Council on the Arts and the Lower Manhattan Cultural Council.

Sound by Edward Tang

www.laksom.com/VRKL_web.html

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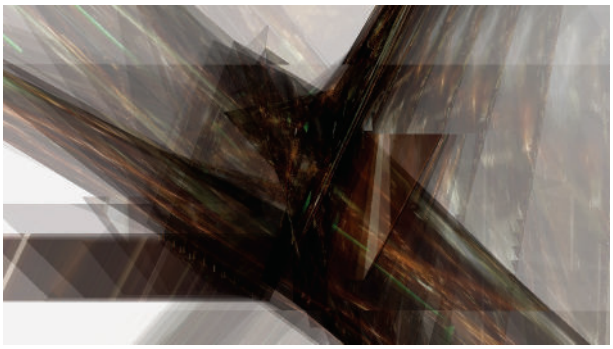

genomixer by stanza

ARTIST STATEMENT
www.genomixer.com

My work involves making sonic and visual mappings based on data that use generative emergent code to make visualisations and artworks. I am interested in the idea of the body as code and architecture, and the emergent systems of code that exist in DNA. I create comparative emergent systems to make artworks. For example, a series of online artworks inspired by the human genome sequence and developed from a DNA profile sequenced from my blood.

These online artworks are investigations into genetic codes mapped and re-assembled online. The series enables a cross reference for all the code on the genome sequence, allowing you to intermix or breed your own variable. You can look at the new mix of chromosomes in real time, online. You can also keep and print this pattern from the web site. The sounds and images of code make audio/visual versions of a self portrait.

My work takes these ideas into a completely new online experience. It seems likely with the advent of self-DNA tests that people will analyze their own DNA frequently. These data can be recorded into the genomixer database and saved. That is, users will have their own personal online audio/visual experience based on their unique genetic code, and because they have the option to save it, they can also see and listen to other users' results. In other words this is a giant open-source audio/visual labyrinth and database. The system uses a generative audio system that can play interactive non-linear audio over the net. The sounds are mapped to the genetic codes. *genomixer* is a complete audio/visual online generative system. Code representing code generated by code made from blood.

TECHNICAL STATEMENT
The *genomixer* series:

- Uses movement, sound, text, and image.
- Crosses borders between artistic and technological sectors.
- Involves co-authored or inter-authored creative processes from other specialists.
- Can be used in a number of formats: web, gallery, and CD-ROM.
- Pieces for the web can be based on telematics.
- Allows engagement of the audience as creative users.

genomixer (three versions online) is an interactive online installation that allows you to cross reference all the patterns on the genome sequence and intermix or breed your own variable and view the new mix of chromosomes in real time online. Input whatever gene you want and scramble the results. The *genomixer* uses stanza DNA made by Imperial College London. Move the mouse about, click on squares, drag the shapes. Click down on highlighted shapes. It is an online internet audio/visual generative installation that requires Shockwave. It is also a real-space installation. Recently, *genomixer* was exhibited at the Site Gallery Colchester and in Cambridge as part of Respond.

mutator (three versions online) is a generative audio system that plays interactive non-linear audio over the net. The sounds are mapped to the genetic codes. This is a complete audio/visual online generative system. Our DNA is a long line of code, a very long line, represented by the letters A, C. G, and T, the set of bases. This code gives us massive clues to who we are and how we work. The sounds are based on stanza DNA structures, and the images are based on stanza DNA profiles. The result is three new generative online musical systems that evolve through sequences of DNA.

junker is a series of generative experiments in replication. They divide and sub-divide as they mix down the DNA sequence. The code just keeps adding to itself forever down a DNA sequence. The idea is to track anomalies, special features, and unusual variations inside the code. Scientists spend their time analysing specific areas of the billions of letters of DNA code in their search for complex patterns that occur deep inside.

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Stefanie Vandendriessche

ARTIST STATEMENT
Atmsferik is the alias for Stefanie Vandendriessche. After studying art history in Belgium, she moved five years ago to Barcelona, where she is studying for a master in digital arts degree at Universitat Pompeu Fabra. She has been developing several projects in the field of digital arts and architecture. As a co-founder of su-studio (www.su-studio.biz), she was involved in developing real-time 3D environments, of which the project *and2* won honorable mention at the Bienal Miami Beach 2001. The project *su-toolz*, a musical environment performed by navigating through 3D virtual architectures, has been presented at MIT-Dublin, NIME.

As co-founder of Brajovicvandendriessche, she explored the relationship between real and digital architecture, from visual installations and performances to physical structures. Their recent projects are *La casa en el Aire*, under construction in Costa Rica, and *Bamboo Ligature*, exhibited at the 5th Biennale of Architecture of São Paolo, Brazil.

As atmsferik, she developed several real-time interactive fairytales and performed them at several festivals. Furthermore, she writes online poetry: www.atmsferik.com

Adjusted daydreams is a real-time 3D environment where players can navigate through 3D worlds using different cameras and interactions to change the worlds' textures. Every world has a different level of abstraction and atmosphere, from very abstract to bizarre psychedelic collages.

Because of the complex combination of camera angles, texture effects, and weird perspectives, the 3D effect is “on the first side” rather than 2D. Nevertheless, the fact that players are navigating in real time means that the moving paintings on the screen will never have the same composition.

TECHNICAL STATEMENT
The visuals are programmed with Virtools software, a program designed to create videogames.

Windows Minimum System Requirements
Microsoft Windows (95, 98, 98SE, ME, 2000, XP, or NT 4.0 with Service Pack 6)
Pentium II (or equivalent)
32 MB of RAM
Internet Explorer 4.0 or Netscape Navigator/Communicator (4.5-4.8 or 6.1-7.01)

Recommended System
Direct3D- or OpenGL-compatible 3D accelerator graphics card with at least 8 MB of RAM
DirectX 7 or higher for Windows 9x

Internet Explorer 6.0 or Netscape 7.01
Monitor color display set to 16 bits (65536) or 32 bits (True Color)
Sound Card

adjusted daydreams

Macintosh Minimum System Requirements
Mac OS X 10.1
G3 Processor
3D graphic processor/accelerator card
128 MB of RAM
Internet Explorer 5.1, Netscape 7.0, Safari 1.0 beta, or Camino 0.7

Recommended System
MacOS X Jaguar (10.2.4)
G4 Processor
Internet Explorer 5.2
256 MB of RAM
Monitor color display set to 16 bits (65536) or 32 bits (True Color)
Sound Card

Restrictions
Javascript communication between web page and the Virtools Composition is not supported
Virtools Physics Pack is not supported
Joysticks are not supported
Right click is not supported

Sound Design
The sound composition was influenced directly by the movement and textures within the visual *Adjusted daydreams*. A sonic topology with a heavy focus on how physical properties of sound can stretch or compress within a daydream state.

Jordan Wynnychuk has researched and performed sound and music worldwide. Currently the director of Squinch Hybrid Realities in Montréal, developing 3D instruments and virtual acoustic systems for architecture. Recent output includes 3D music videogames and acoustic architecture with Barcelona´s su-Studio, directing the Wrong Festival in experimental media, and errorclub underground audio and gaming club.

Credits
Sound Design: Jordan Wynnychuk
Collaboration in programming: Luka Brajovic

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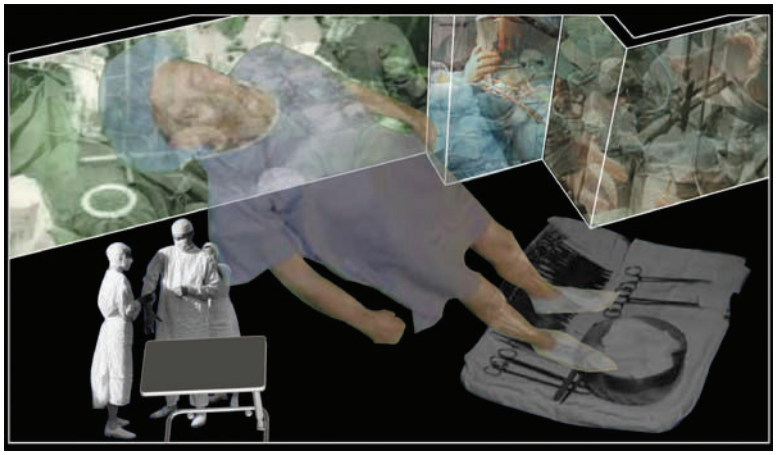

Life Support

ARTIST STATEMENT
Annette Weintraub is a media artist whose projects embed layered narratives within a variety of architectural constructs. Her work is an investigation of architecture as visual language and focuses on the dynamics of urban space, the intrusion of media into public space, and the symbolism of space. She creates large-scale web projects that integrate elements of narrative, film, and architecture within a conceptual representation of space, often using sound to spatialize that structure. Her projects incorporate photo-based imagery, texts, and moving images in a densely layered space that encourages simultaneous reading, hearing, and seeing. She uses narrative features such as multiple story lines that intersect at random intervals to create larger narratives, and she intermixes factual and fictive elements, and a range of storytelling modes. As part of an investigation of how our sense of place shapes behavior and is memorialized in recollection, she is now working with hybridized constructs of 2D and 3D to explore modes of spatial representation and the subjective experience of physical space.

Technical Statement
Life Support (www.annetteweintraub.com/lifesupport/index.html). Hall for dreamers or impersonal machine? Hospital architecture is an amalgam of elements derived from religion, the military, and the factory. *Life Support* explores this symbolic coding of space and its underlying mythologies. Four spatial hybrids mixing 2D and 3D representation act as narrative containers for issues of hierarchy, mechanization, privacy, and identity.

Life Support explores the subjective experience of space. It looks at the way in which medical environments affect behavior, perception, and perhaps healing. The symbolism of space is deeply ingrained, perhaps physiological. Subtle aspects of environment influence behavior, mood, and perception. We read the underlying messages of rooms dedicated to waiting, to sleep, to punishment, or to death through their design, ambience, and contents.

"Hospital" comes from the Latin "hospes," meaning guest or host, the same root as hospitality and hotel. A contemporary hospital might contain vestiges of the cruciform design of the Renaissance hospital, the panopticon of the prison, and the compartmentalization of the industrial factory. *Life Support* draws upon depictions of medical spaces in advertising, popular culture, and film, and their reintegration into this vocabulary of space.

Life Support creates a series of "rooms" based on archetypal hospital spaces: a corridor, waiting room, patient room, and treatment room. Each of these locations is associated thematically with a particular psychological state or adaptation response and explored in moving images paired with short fictions and architectural commentary.

These spaces are hybrids of 2D and 3D elements in which the 3D spatial construct (a wireframe of a room) functions as a scrim for projection of multiple images and as a container for layering of audio elements. Movement through space and narrative movement are linked, as in a walking meditation.

Life Support is a Flash-based project incorporating extensive sound, composited animation, still images, and 3D models within a wireframe construct of 3D space. The Flash 6 plug-in is required, and external speakers are recommended for best sound quality.

CREDITS
Todd Holoubek, Actionscript
Jacob Burckhardt, Sound recording
Bill Rice, Actor/voiceover

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www.marumushi.com

Marcos Weskamp

Habitat Perspectives

ARTIST STATEMENT
www.marumushi.com/apps/perspectives/

The idea behind *Habitat Perspectives* is visualizing spatio-temporaly the places we inhabit. Viewers can follow the participants live, posting imagery to this application from the road through GPS-enabled mobile devices. The goal is to conceptualise how the perception of the city differs from participant to participant, depending on their everyday habits. In the beginning, a black background will predominate in the application, but as participants post more and more content, a map of the city, and the map of each of the participants "places" will slowly emerge.

TECHNICAL STATEMENT
Participants post GPS-coded pictures from cell phones The images are plotted in a web application, slowly building the participant's particular view of the city.

Technical requirement: Macromedia Flash Player 6 or higher.

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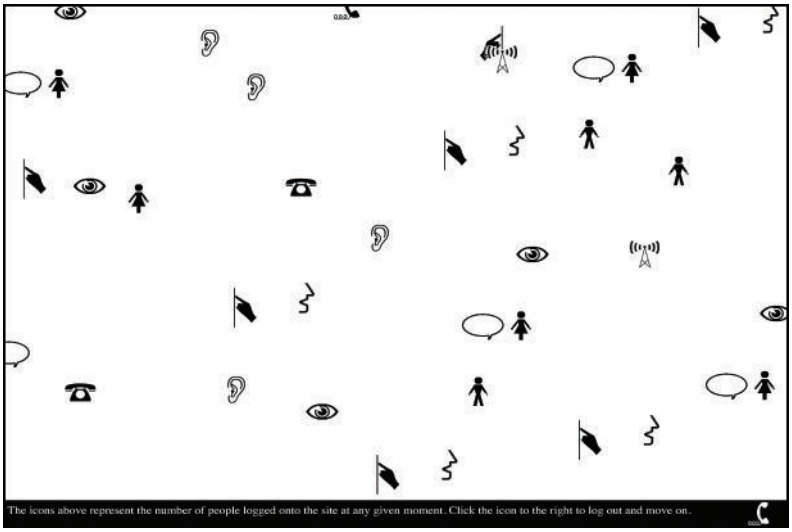
Jody Zellen



Disembodied Voices

ARTIST STATEMENT

Jody Zellen is an artist living in Los Angeles, California. She works in many media simultaneously, making photographs, installations, net art, public art, and artists' books that explore the subject of the urban environment. Recent exhibitions include: Futuresonic 04, Manchester; Images Festival, Toronto, 2004; Downtown Digital, Pace Digital Gallery, New York, 2003; Day Job, New Langton Arts, San Francisco, 2002; the XXV Bienal de São Paulo, 2002; Urban Festival, Zagreb, 2002; FILE:2001 Electronic Language International Festival; Artfuture2000, Taipei; International Biennial of Architecture, Florence; and Net_Condition, ZKM, 1999. Her web site, Ghost City (www.ghostcity.com), begun in 1997, is an ever-changing, poetic meditation on the city. In addition to Ghost City, her other web projects include Random Paths (www.randompaths.com) and Visual Chaos (www.visualchaos.org). A recent project, Crowds and Power, was the October 2002 portal for the Whitney Museum's artport (http://artport.whitney.org).

Disembodied Voices, her latest project, is a meditation on the nature of public space. It is a visual representation of how different bodies communicate across space, using cell phones as a metaphor for the new translocal of connected, disembodied voices, linked across space invisibly – forming an unseen network of wanderers, always within reach yet nowhere in sight. We now have private conversations in public, and in so doing, these conversations, or at least half of them, become public events, a half-dialogue that no longer knows such a thing as privacy. As the line between public and private continues to blur, intimate transactions have become audible to anyone within earshot. Where we are, in a sense, no longer matters, since we are always connected.

This site illustrates the collision of the personal/private and public space. Cell-phone users, increasingly oblivious to their surroundings, remain undaunted by the fact that to anyone nearby, they appear to be carrying on animated monologues, stopping, gesturing, and often yelling into empty space, behaving similarly to the street person who they surely would go out of their way to avoid. With the introduction of new technologies into the urban environment, the lines between the sane and the insane are becoming blurred, as we all participate in conversations with invisible friends who no one can see or hear, adding to the chaos, confusion, and intricacy of life in the city.

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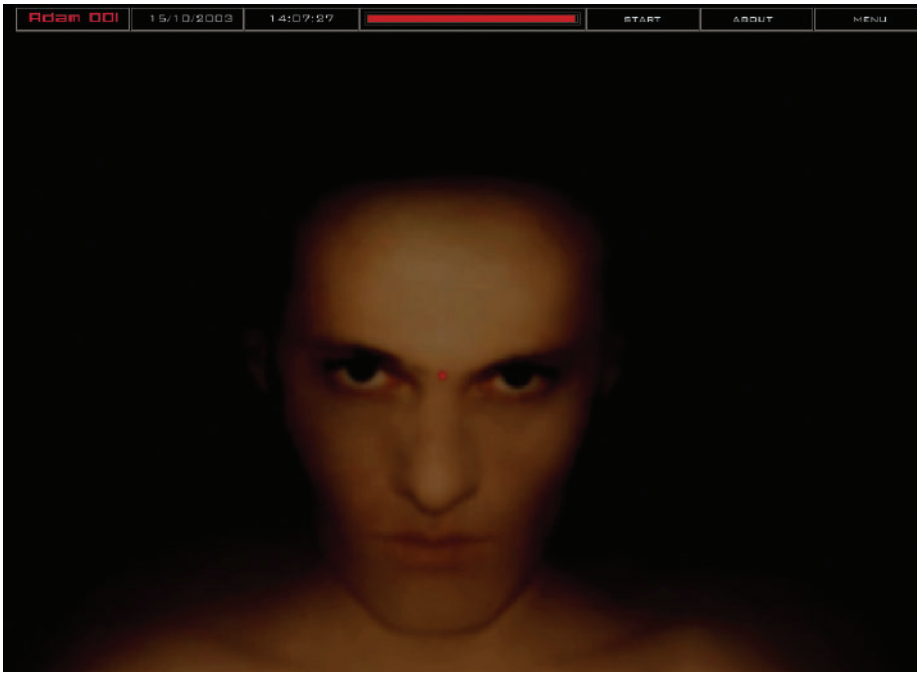
Yuli Ziv



Adam001

ARTIST STATEMENT
This project deals with issues of the internet era such as privacy and exposure, personal and public, physical and virtual. *Adam001* is a virtual character created when all the fragments of human energy that were scattered around the virtual world came together. He is the reflection of all that is human that we hide in our lives and uncover in a virtual world: sensitivity, pain, and nudity. He is universal. He is a part of us and we are a part of him.

www.yuliziv.com/adam001.html

TECHNICAL STATEMENT
The piece was created with different kinds of digital materials, including digital images, digital sounds, and art objects that were found on the net (like the pictures of men, which were taken from dating web sites). All the materials were processed with image/sound editing software and combined together with multimedia tools to make the piece interactive.

www.web3dart.org

WEB3DART 2004

WEB3DART 2004, an international juried selection of 3D web projects, was premiered at the Web3D Symposium, the 9th International Conference on 3D Web Technology, April 2004 in Monterey, California. A special selection of work from that exhibition is presented in the Art Gallery at SIGGRAPH 2004.

In its fifth year, WEB3DART shows the content and structure advances that are possible in web 3D. The works amplify a new wave of creative output by artists and designers, who are integrating internet and 3D visualisation. They integrate audio and video, navigation, Java 3D, Flash, and Shockwave for viewers like Cortona, Sculpt3D, Atmosphere, Flux, and Virtools.

macronaut
An attempt to produce a music video using only code-generated elements.
Karsten Schmidt
Ralf Sturm
United Kingdom
www.toxi.co.uk/macronaut

Virtual & Real: K-Dron and Light
Inspired by Janusz Kapusta's K-Dron shape and its luminous properties when stimulated by light.
Przemyslaw Moskal
USA
www.laksom.com/VRKL_web.html

Le printemps noir
A 3D VRML world that explores the relationship between memories and space.
Oliver Dyens
Canada
www.chairetmetal.com/printemps/

Blocc6tm
A sound application in a 3D graphic multi-user environment. A collaborative sonic composition in a shared universe.
Benjamin Grillet
Belgique
www.bloc6tm.com

Virlab
Experimental Web3D systems that enable random choreography.
Gregoir Zabre
France
www.nobox-lab.com/virlab

3D Navigation System
An alternative to the conventional 2D tree or window-like structure.
Janis Garancs
Latvia
garancs.net

Komandos Project
A real-time audio performance environment.
Sonia Cillari
The Netherlands
www.iua.upf.es/~scillari/komandos-def.htm

knowscape
A digital data territory and an experimental project: a space made of links, connections, relations, knowledge: a networked space.
Patrick Keller
Switzerland
knowscape.fabric.ch/mobile

Vectorial Elevation
A large-scale interactive installation that transformed Lyon's historic city center using robotic searchlights controlled via a 3D environment on the internet.
Rafael Lozano-Hemmer
Canada
www.alzado.net

Chromacy
An exploration of 3D space on its own terms.
Adam Nash
Australia
yamanakanash.net/3dmusic/chromacy.html

Dreamaphage
This piece relies on the three-dimensional space of an interface to interact with the work.
Jason Nelson
Australia
www.heliozoa.com/dreamaphage/opening.html

iamme
Michael Atavar
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www.atavar.com/iamme/

Organizer
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The Kitchen as a Graphical User Interface

ABSTRACT
Everyday objects can become computer interfaces by the overlay of digital information. This paper describes scenarios and implementations in which imagery is digitally painted on the objects and spaces of a kitchen. Five augmented physical interfaces were designed to orient and inform people in the tasks of cleaning, cooking, and accessing information: *Information Table, Information Annotation of Kitchen, HeatSink, Spatial Definition,* and *Social Floor*. Together, these interfaces augment the entire room into a single graphical user interface.

Keywords
Kitchen, spatial definition, physical interface, virtual space, human-computer interaction, gesture recognition, neural network.

Introduction

From indoor plumbing to microwaves, technology often enters the home through the kitchen. Kitchens are multi-functional, serving both as social hubs and as cooking laboratories. The overlay of digital information can help to organize these multi-use, highly technological rooms by facilitating contemporaneous use by different members of a family.

Approach

The decrease in price of multimedia projectors has made it possible to treat an entire space as a single, high-resolution display. With information projected throughout the space of the kitchen, users no longer have to carry around books or computers to inform their tasks. We dispersed projectors and other types of illumination throughout a kitchen to uncover the range of interactions between the kitchen and its users. Various input devices coupled with the projectors inform the projected content. Gesture sensing and interaction-free displays provide information where and when it is needed while requiring minimal interference (Hillerer, Feiner, & Pavlik, 1999).

Figure 1. Information Table

Information Table

In *CounterActive* (Ju, 2001), recipes were projected on a countertop, informing activity in a fixed point in the kitchen. The *Anywhere Display* (Pinhanez, 2001) allowed a single projection to move on most of the surfaces of the space. This technology was expensive and not suitable to multiple users. In multi-use kitchens, information should be targeted to specific tasks and permit multiple users to move within the space while their information follows them. Information Table is an example of orienting imagery to follow users as they move through the space and perform different tasks (Fig. 1). A ceiling-mounted projector coupled with a digital camera senses the position of the table and moves the corresponding display to follow the tabletop. Simple vision-recognition algorithms recognize the form of the table, while a Flash program masks the projected output for a seamless tabletop projection.

In addition to following physical movements, *Information Table* changes projected content based on what task is being performed. When the movable table is placed against a wall, it acts as a countertop for single-user frontal work. For such work, projected information is best placed in front of the user on the wall where it will not interfere with hands or the work surface. The image shifts from the ceiling-mounted projector to a wall-mounted projector when the table approaches the wall of the kitchen. When the table is moved to the center of the room, it acts as a dining table. The projection shifts to the ceiling-mounted projector, and a concentric game or menu is displayed on the table.

Figure 2. Information Annotation of Kitchen

Information Annotation of Kitchen

The kitchen as a graphical user interface can coordinate the multiple events that take place within, from people working and playing to the autonomous behavior of the stove, dishwasher, and refrigerator. How can all of the users of a kitchen be made aware of the many visible and invisible operations under way in the kitchen?

We project textual annotations on the entire working environment, as shown in Figure 2. The refrigerator is “painted” with text and images to describe its contents and the items that need to be purchased, in addition to serving as a digital bulletin board. The dishwasher displays whether it is clean or dirty, empty or full. The electric range informs users on the temperature of its burners. A single multimedia projector can position the information directly on all of these appli-

ances, where users will be certain to notice it. The same system used to annotate the kitchen can be used to decorate the space. Games and other interaction can be projected on work surfaces when the work is finished, while decorative textures can be mapped to change the mood and function of the space depending on its function.

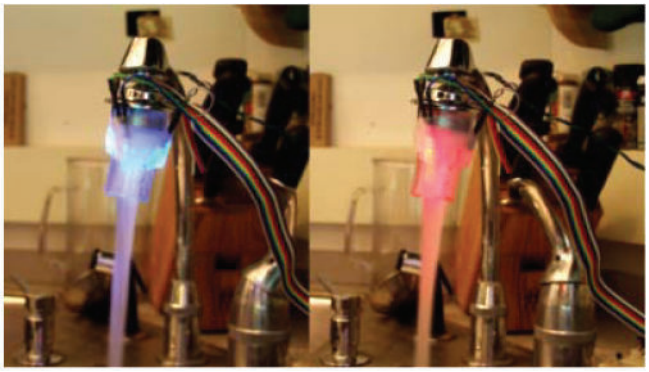

Figure 3. HeatSink

HeatSink

Like *Information Annotation of the Kitchen, HeatSink* projects task-specific information directly onto the object being measured, in this case water itself. A microcontroller measures the temperature of water exiting the tap and projects colored light into the stream of water to indicate its temperature: red for hot and blue for cold (Fig. 3). Users can intuitively gauge the temperature of the water without getting their hands wet. Successive users automatically know what the prior water temperature was and avoid scalding themselves.

Spatial Definition

Some areas in the kitchen can be dangerous to newcomers. It would be helpful if certain conditions (such as a hot stove or a knife on a table) could be easily denoted and communicated to newcomers (Fig. 4). When someone enters these zones, some automated multi-media reminder would make one aware of unseen dangers. We have explored two ways for such zones to be easily denoted and stored in a computer: a kitchen design GUI and a gesture language.

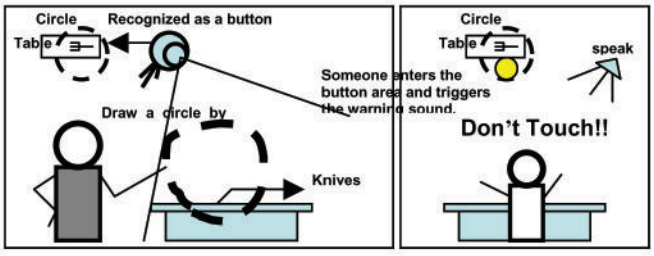

Figure 4. Spatial Definition

The kitchen design GUI consists of a plan of the kitchen projected on a countertop with a drawing interface that allows users to denote areas as dangerous. Users can also annotate an area such as the table to show the menu when users sit around it.

Gesture recognition techniques (Bretzner, Laptev, & Lindeberg, 2002) are widely used as intuitive input interfaces. Our gesture language allows users to specify a reminder zone directly on the space itself so that anyone entering that zone triggers an audiovisual reminder. Video cameras dispersed through the space recognize a basic gesture language and create virtual zones to map the physical environment accordingly. To find the position of a user's hand, we use image-processing techniques that track color and motion in Visual C++. The hand acts as a spatial pen so long as certain recognizable gestures are made in front of the webcams. A back-propagation Neural Network (Haykin, 1998) trains pre-defined shapes (circles, triangles, arrows, and crosses.) The network recognizes simple gestures if the path of the hand follows one of the predetermined shapes. The gesture language for spatial definition denotes an audio reminder zone with a circle, a danger zone with a triangle, and a visual reminder zone with an arrow.

Once a zone is programmed by the gesture language, the same webcams serve as motion detectors to detect when someone enters the zone. Each part of the kitchen can be programmed with reminders without interfering with the tasks being performed.

Sociable Floor

The floor is the architectural surface that receives the most physical interaction. By monitoring use of the floor and projecting onto it, many useful functions can be played out.

We use a modular tile floor with capacitive sensors under the 12-inch x 12-inch raised modules. Ceiling-mounted projectors paint the floor with information gathered from where and when people stand on the various tiles (Fig. 5).

Figure 5. Sociable Floor

Sociable Floor can augment the sensing already discussed by judging exactly where different users of the kitchen are standing. The system can warn users when they are working too closely and allows for projected information to accurately follow individual users as their tasks carry them through the kitchen.

DISCUSSION

The pervasive virtual world is becoming an important part of our lives. Unfortunately, we are only able to look at information in books or on computer monitors. Computers, projectors, and video cameras have become sufficiently affordable to allow for vision recognition and projection on all the available surfaces of a space. These systems can

improve productivity and reduce the need for books and portable computers, as well as allowing for more free space.

All five of the interfaces discussed were presented at the Things That Think (TTT) consortium meeting at the MIT Media Laboratory in October 2003.

These interfaces stand to be considerably improved. Information Table currently has only two modes: countertop and dining table. Considering the numerous functions possible on a work surface in a kitchen, the system can only gain richness by being conceived for additional uses.

Information Annotation of Kitchen would be even more helpful if it could respond automatically to events before and during their occurrence. For example, before we try to open a hot pot, it should tell the temperature of the pot and record our body and hand positions.

In the Spatial Definition system, we have suggested a solution to better describe the spatial events of the kitchen. We only use the spatial regions as virtual buttons, pressed or released to trigger events. Once the system can accurately judge the activities being performed, it will be able to automatically deliver useful information. In the future, we will use a thermal imaging camera to better recognize human activities and monitor temperatures in the kitchen.

CONCLUSION

This paper describes using dispersed task-specific annotation to make information available throughout a kitchen. We present digital information on walls, countertops, tables, appliances, the floor, and water itself. The resulting annotated space can help people to collaborate, to work more efficiently, and to avoid accidents. The appliance and kitchen design industries have been working to use appliances to communicate with each other and with users. Our approach is to annotate the entire kitchen space for the many purposes that were not designed to be contemporaneous but often are. This paper promotes the possibility and value of using cameras and projectors to make total interfaces from traditional kitchen spaces (Cruz-Neira, Sandin, & DeFanti, 1993).

The use of the physical world as a user interface is becoming a reality. Inexpensive hardware can now be utilized to react to where people are and what they are doing. Such context-aware (Selker & Burleson, 2000) use of sensors and effectors to model tasks and augment performance is becoming more and more possible.

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Sensational Technologies

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ABSTRACT
This paper is part of an ongoing study of performances that make a physical and psychological connection with the public by synthesizing various media such as sound, image, smoke, smell, etc. The research project will focus on the history of the live image and try to connect this to current practices in popular culture and art, for example live video jockey (VJ) performances and interactive-technology-based installation art. For our presentation at SIGGRAPH 2004, we will concentrate on three cases that make use of state-of-the-art technology in order to create specific bodily sensations. We will also take their temporal character into account and explore whether, and if so, how these "events" can be presented and preserved for future generations as part of our cultural heritage.

INTRODUCTION

In her presentation Burnt Offerings at ISEA2000, Margaret Morse tries to invoke a new interest in sensorial art by suggesting that "our new century is becoming increasingly infused by odours that mark a cultural transition into a digital culture." She continues:

> Smell is already virtual insofar that it is an immaterial and largely invisible atmosphere that announces a body or an environment. Like the virtual, it is a thing or a world in effect, but not actually. Odours mixed and distributed in the atmosphere are most often apprehended accidentally and subconsciously. However, an odour can suddenly become conscious, evoking a strong sense of another time and place.[1]

As smell is difficult to define because of its formlessness and continuous state, one could state that there is no aesthetics of smell and no olfactory art. Morse counters this assumption by "showing examples that show just as odour has become more a socially important, distanced, and controlled phenomenon in certain spheres of society, odours have emerged more consciously as an art form used to make an aesthetic and cultural statement."[2]

Although Morse focuses on smell, today's art practice shows that there is a true revival of the various senses in arts and theory. More and more artists are working with sensorial elements, from smell and taste to touch. Moreover, these artists are exploring creation of synaesthetic experiences by actively using or addressing the spectator's senses.

In this paper, the focus will be on the use of technology in installations and performances that use the senses to create a sensorial or synaesthetic experience. Stepping away from the purely visual appeal, three different approaches will be described that shed light on the diverse use of the senses in combination with technology.

Perhaps not surprising, but nevertheless interesting, is that each new step in technological innovation generates experiments in synaesthetic experience. A good example is the invention of the "Laterna Magical." As its name implies, the public was invited to see something magical. The first lanterns were already invented in the 17th century. And although they impressed the audience as sheer magic, the idea was fully developed in the next century. This was mainly due to the heavy and impractical size of the apparatus. With technical improvements, the lanterns became more transportable, and therefore their popularity grew. People started to experiment with projecting images on smoke or mirrors; the result was a feeling of transparency and immateriality. At the turn of the 19th century, this led to a whole series of especially ghostly performances. The most famous of all were the Phantasmagorias by the Etienne-Gaspard Robertson, of Belgium. His intentions were clear: "I am only satisfied if my spectators, shivering and shuddering, raise their hands or cover their eyes out of fear of ghosts and devils dashing towards them; if even the most indiscreet among them run into the arms of a skeleton."[3] Through the rest of the century, special buildings were built for performances that immersed the audience in a spectacle of light, sound, smoke, and smell that invoked both emotional and bodily sensations.[4] However hard it seems today to recognise the powerful effect of the illusion, many observers stressed the convincing nature of the apparitions. "Robertson described a man striking at one of his phantoms with a stick; a contributor to the *Ami des Lois* worried that pregnant women might be so frightened by the phantasmagoria that they would miscarry."[5]

CRITICAL WRITING ON THE SENSES

Much has been written about the senses and the importance of bringing the senses into life and art. In the critical and theoretical art historical writings of the last century, the confusion and near discomfort in descriptions of sensorial experiences are striking. In describing and ascribing works of visual art, the most privileged sense has always been sight, and in the realm of film and theatre (to some lesser degree), hearing. When people have tried to explore the complex relationship between our senses and the arts, their writings have often been discarded as unscientific. This was the case, for example, in Peter Wollen's study on filmmaker and theorist Sergei Eisenstein. While Wollen mentions Eisenstein's investigation of the synchronisation of the senses, recognizes the importance of these writings, and states that Eisenstein's writings on synaesthesia are of great erudition and considerable interest, he nevertheless discards them as being of a "fundamentally unscientific nature."[6] In the 1930s and 1940s, several other authors acknowledged the importance of the senses, but contemporary studies have elided these observations, until recently.[7] Professor of film studies Vivian Sobchack tries, as Morse has tried, to invoke a new interest in the sensorial. Moreover, she opts for an approach that explains the concept of embodied vision through cinema. In her words, she wants to "posit the film viewer's lived body as a carnal 'third term' that schismatically mediates vision and language, experience and image."[8] Sobchack tries to step away from the "common" theories that deal with experience in relation to engagement with and recognition of characters or subject positions.

> I want to insist that I am not speaking metaphorically of touching and being touched, but "in some sense" quite literally of our capacity to "feel" the world we see and hear on-screen and of the cinema's capacity to "touch" and "move" us off-screen.[9]

When exploring "the sensorial experience" in today's art practice, one encounters various approaches. In some cases, the work appeals to the senses even though the synaesthetic or sensorial experience is not the main concern of the artist. In these situations, the materials used by the artist function as a stimulus for the senses. Even though not intentionally a bodily sensorial experience, the work can be viewed in this respect. In other cases, the senses play a more prominent role but are still treated or used as an interface, or as extensions of an interface, to enhance a non-sensorial concept. These installations use one or more sense organs to directly evoke something else. For other artists, the main concern is to create a sensorial experience: artworks that have as their main goal the creation of an (emotional) aesthetic experience and call upon various senses (sight, sound, touch, smell, or taste) to achieve this.

THREE EXAMPLES

Today's increasing interest in "sensorial art" is believed to be a counter action in response to the digitalisation of our society and the increased use of technology in art, which generates (again) work that is not recognised as art forms that can withstand the criteria of 'high art'.[10] Yet elaborate artwork such as the immersive VR worlds Osmose and Ephémère by Char Davies, live performances by Barkode, and the installation Tickle Salon by Erwin Driessens and Maria Verstappen show that an immediate, bodily, sensorial aesthetic experience can be enforced by means of digital technology. These are experiences that echo Romantic aspirations but are truly products of our own time and age, employing state-of-the-art technologies within contemporary artistic practice. These examples show that without innovative technology, these projects would not have been possible. They are, nevertheless, not necessarily about technology, but first and foremost they are sensorial experiences.

Char Davies: Osmose (1995) and Ephémère (1998)

For our first example, we will go back in history, to one of the first works of art that used new technologies in a sensational way. With a background in painting, Char Davies started working on Osmose in 1994. Osmose is an immersive, interactive VR environment involving a head-mounted display. Although her intentions were to explore the use of 3D imaging to create immersive environments that were computer generated and not about mimicking reality, her inspiration came form nature itself. The created environment turned out to be, unlike most VR explorations, a visually impressive simulation of a series of widely branching natural and textual spaces. The installation offered people the opportunity to go on a personal voyage and encounter abstract images of nature. What makes the work exceptional and appealing to the senses is Davies' use of the interface. Instead of using a keyboard or screen she invented an interface that is coupled to the body. Inspired by her experience as a diver, she created a special vest with sensors that registers every movement and reacts to the wearer's breathing in or out. Similar to being underwater, users can move through the installation by controlling their breathing and movements. Using internal and external bodily movements in such a way enhances the whole feeling of being immersed *in* the image space. Even though the intentions in developing the work were not technologically motivated, in almost every case the installation was presented at technological festivals or symposia. We, however, feel that the intentions and moreover the experience are not about the use of technology but foremost the experience of sensational capacities.[11] As Davies herself asserts:

> In my work, I'm attempting to *reaffirm* the role of the subjectively-lived body. Rather than deny our embodied mortality and our material embeddedness in nature, I seek, somewhat paradoxically through a highly technologicalized art form, to return people to their bodies and to the earth by using VR to *refresh* their own perceptions of an embodied being-in-the-world, to return them to a perceptual wonder at being here.[12]

The installation Ephémère (1998) is more abstract than Osmose. The iconographic repertoire in this later work is extended to include body organs, blood vessels, and bones, suggesting a symbolic correspondence between the chthonic presences of the interior body and the subterranean earth. Instead of representing nature as realistically as possible, Davies attempted to "represent nature as an operatic flux, with everything flowing, with many different elements coming into being, lingering and passing away."[13]

The virtual worlds in both installations are generated in real time by high-powered processing engines that make each visit a different experience. Although the structure of the installation is a stand-alone system, the dark auditorium with the screen is reminiscent of a theatre or cinema. In both Osmose and Ephémère, the individual experience can be watched in real time. An audience can see the choices that are made by the immersant and hear the sound generated by the immersant's behaviour. The shadow-silhouette of the immersant is also projected live onto another screen, emphasizing the relationship between bodily presence and the immersive experience.

Barkode: live VJ performances (1999 – today)

Synaesthesia is now very prominent in daily life. When we walk into shops and cafes or stroll along the street, our various senses are under constant assault. People get overwhelmed with musical beats accompanied by flickering lights and video and digital imagery, all of them trying to keep up with the music. These happenings come together in the club scene, where the sounds merge with light, images, smoke, and even smell. After the popularity of the disc jockey (DJ), the video jockey (VJ) entered the club scene in the late 1980s. The term VJ was popularised in the beginning and mid-1980s by MTV, the cable music channel. A few years before, the end of the 1970s, the term was introduced by the crew of the Peppermint Lounge, a popular dance club in New York. The performers wanted to distance themselves from the stuffy video artists that were part of the art and cultural scene in New York. MTV co-founder Bob Pittman appropriated the term for his MTV presenters.[14] To this day, the term VJ is still a disputed name.

Although the differences among VJs are enormous nowadays, some

make a physical and psychological connection with the public by synthesizing various media (sound, image, smoke, smell, etc..). These synaesthetic performances can be seen as the first attempts to create a virtual reality outside the confinements of the CAVE (Cave Automatic Virtual Environment) or specially designed suits, in spaces in which the participation of the public is crucial to the success of a performance.

The Dutch VJ collective Barkode wants to create a synaesthetic performance by triggering the subconscious. Their show is a succession of encounters, chance meetings of words, images, and sounds, all made with digital means, first recorded on video and then later live-mixed with digital music. Many transparent layers overlap, leaving the viewer lost in time, space, and emotion. But as time passes, more story lines develop, which makes the experience even more unclear. Does the spectator find the plots, or are the consecutive images and sounds leading up to something? Barkode describes their shows as "confusing constructivism," inspired by the subconscious. By adding smell to the images and the music, they augment the atmosphere; pleasant smells heighten the experience, and foul odours trigger feelings of disgust. Their performances are a postmodern version of the experiments done in the Romantic area and in Sensurround films of the early 20th century, when smell cards were given to the audience to accompany the sensations in the film.

Erwin Driessens & Maria Verstappen: Tickle Salon (2002)

The Dutch duo Driessens and Verstappen developed Tickle Salon because they like the sensation of being tickled. "When a human being is gently tickling somebody, sooner or later tiredness and slackening of attention will appear. Therefore we developed Tickle Salon: a robot installation based on the concept of automated caress."[15] Tickle Salon consists of a bed and a small "brush" hanging from the ceiling and connected to a small motor, which in turn is connected to a computer. The installation is controlled by a host(ess), who turns on the computer when the visitor is lying comfortably on the bed. The brush starts to stroke the body in random patterns. The contours traced by the brush are simultaneously reflected in a 3D computer drawing on a screen. The interaction of the body with the machine is regarded as crucial to the meaning of the work. In other words, if nobody participates in the work, the robot cannot properly function. It cannot create a sensorial experience, and the artwork loses its meaning.[16] Appreciation of the artwork lies not in the least in the artists' ability to create a profound sensual experience using new technologies in an intelligent and innovative manner. To cite the jury report of the Telefonica Foundation Art and Artificial Life Award:

> Tickle Salon combines a remarkable technical achievement with an elegant concept, a touching interface, and edgy irony – but most importantly, anyone would want the device in their bedroom. (…) This two-way feedback gives a convincing sense that the machine feels the person while the person feels the machine.[17]

The artwork addresses both the visual and the physical or haptic perception.[18] The "blind" machine senses the contours of the human body through touch and then translates this into a visual representation of its form. The subject feels the caress and simultaneously sees the stroking as the body is shaped on the screen. Besides touch and vision, there is also the soothing sound of the stepper motors that corresponds with the movements of the metal ball and brush. Also, though not intended by the artists, there is the fragrance of the previous user. As mentioned before, the ultimate goal of Tickle Salon is the evocation of an immediate physical and sensorial experience. Tickle Salon is not about a multi-sensorial experience; rather it *is* a multi-sensorial experience. In fact, to some extent the installation is in itself a haptic sense organ.

When Driessens and Verstappen talk about their work, it becomes apparent that their interest is not so much in the creation of the best tickling apparatus, but in the processes in artificial life. "We are not interested in imitating or simulating existing processes. But instead, we wish to implement processes that make use of these specific capabilities in such a way that forms of artificial life are created."[19] Whereas Davies and Barkode are interested in creating synaesthetic experiences and use technology to trigger the senses, Driessens and Verstappen turn the process around. By creating a machine that is a multi-sensorial experience, they seem to be more interested in artificial life than in the synaesthetic reaction that is provoked by the technology they use. In other words, they use the sensorial to find new processes in artificial life, whereas their installation in real life turns out to be a wonderful sensorial experience.

DISCUSSION

Even though the two works of Char Davies have been around for a long time, a relatively small number of people have had the pleasure of experiencing these artworks. As with the performances of Barkode, Tickle Salon by Driessens and Verstappen, and many others, these artistic activities that use state-of-the-art (but obsolete) technologies are considered to be temporal events or projects. These works often exist outside of the museum context, and in many cases they can only be experienced during electronic art festivals, temporal exhibitions at media institutes, or in the case of Barkode, in the club scene. What might this say about the status of these works in the realm of the arts, and what does it mean for the preservation of such works? Although many artists themselves try to document as much information about their installations as possible, when these valuable records are not centrally archived, these installations will probably not have a long lifespan. In the wider range of media art, an image in a catalogue is hardly sufficient to understand the working and meaning of the work. When it comes down to works that deal specifically with sensorial experiences, like the ones we mentioned above, it becomes even more deficient. This leaves us with some pressing questions: Which methods are emerging in order to open up the closed circuit of the art system for discursive approaches?[20] But also: should, and if so, how can these "events" be presented and preserved for future generations as part of our cultural heritage?

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NOTES

1. Margaret Morse, 2000
2. ibid.
3. www.acmi.net.au/AIC/PHANTASMAGORIE.html
4. The synaesthesia of images, smoke, and music was improved by the various lenses that got developed for the lantern, which made it possible to project overlapping images that even gave the impression of movement. These performances are regarded as among the first cinematic experiences. Moreover, I would argue they are the first DJ/VJ performances.
5. Terry Castle, 1995, p.150.
6. Vivian Sobchack, 2000.
7. ibid.
8. ibid.
9. ibid. Laura U. Marks also develops in her book *Touch. Sensuous Theory and Multi-sensory Media* (Minneapolis: University of Minnesota Press, 2002) a critical approach that emphasises the tactile in favour of the visual. Also Jennifer Fisher in her article Relational Sense: Towards a Haptic Aesthetics, in PARACHUTE #87, Summer 1997, pp. 4-11 (also alcor.concordia.ca/~senses/Fisher.htm) makes a clear distinction between the visual and the haptic sense.
10. The debate between high and low art is still vivid today. This paper will, however, not touch upon these discussions.
11. This could partly be explained by the fact that the installation has been experienced by relatively few people. It has only been exhibited on less than 10 occasions in 10 years time. During these presentations, it was usually up no longer than a few days.
12. Carol Gigliotti, 2002, pp. 64-73.
13. ibid.
14. Strikingly, the term VJ is still associated with MTV. On a well-known VJ mailing list, eyecandy Stefan G. tells a nice anecdote: “Funnily enough, when MTV were scouting around for Presenters six months or so before they started, they put out a call for VJs to send them demos. Everyone who was a working VJ at the time sent them MAD multilayered mixes thinking that’s what they meant! They had to put out another press release clarifying that they defined VJ as an on-air personality not a visual mixer! Shows how corporations can co-opt and redefine our own terminology. Twenty years later even VJs think that the term was invented by MTV...” (Stefan G. on eyecandy, Wednesday, 14 March 2001, 7:49 pm, Message 7206).
15. Erwin Driessens and Maria Verstappen, www.xs4all.nl/~notnot/TickleSalon/TickleSalon.html
16. It must be noted that during so-called public sessions the artists also offer their audience the possibility of a more remote engagement with the work. In these public sessions, the audience can view the functioning of the artwork while somebody else (a volunteer from the audience or a model) lies on the bed and is stroked by the robot. This staging adds a more theatrical or performance-like character to the work and offers the audience a rather voyeuristic experience instead of “the real thing.”
17. Tickle Salon has been rewarded first prize at LIFE 5.0, 2002, an international competition on art and artificial life. www.fundacion.telefonica.com/at/vida/paginas/ev5.html
18. Art theorist and critic Jennifer Fisher, in her article Relational Sense: Towards a Haptic Aesthetic, says that the haptic sense “describes aspects of engagement that are qualitatively distinct from the capabilities of the visual sense. Where the visual sense permits a transcendent, distant, and arguably disconnected, point-of-view, the haptic sense functions by contiguity, contact, and resonance. The haptic sense renders the surfaces of the body porous, being perceived at once inside, on the skin’s sur face, and in external space.” (Jennifer Fisher, 1997; also alcor.concordia.ca/~senses/Fisher.htm).
19. Annet Dekker and Vivian van Saaze, interview with Erwin Driessens and Maria Verstappen, summer 2003.
20. This last question is also a the topic of >>Present Continuous Past(s)<<, an international symposium in Bremen, Germany about strategies for the preservation and mediation of video art. http://www.imediathek.org/english/index.html

Audiovisual Discourse in Digital Art

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ABSTRACT
This paper discusses art systems that employ image and sound as equal elements. This can be called the evolution of the "audiovisual discourse" in art and technology. Recent software for manipulation of audio and visual material is briefly described, and audio/visual digital artworks, developed during an artist-in-residence-based project, are illustrated as examples of contemporary artistic projects concerned with this theme. Different artistic approaches in the use of audio/visual systems are identified on the basis of the historical research and the second author's work, as a technologist, in collaboration with the artists participating in the project. Finally, the role of the computer as audio/visual instrument is discussed.

CR Categories: H5.m.
Information interfaces and presentation: Miscellaneous
Keywords: digital art, synaesthesia, music, studies

INTRODUCTION

Since antiquity, there has been a desire in human beings to search for unifying principles that could explain and summarise our multisensory experience of the world. In all disciplines (religion, aesthetics, astrology, science, philosophy, mathematics) thinkers and philosophers looked for an all-embracing harmony principle that was believed to be based on numbers. The search for a scientific relationship between colour and sound can be considered as a part of this wider search for harmony. Pythagoras discovered the relationship between musical sounds, the length of strings, and the division in octaves (van Campen, 1999), while Aristotle produced a colour theory in which he related the consonant quality of tone intervals to colours (Jewanski, 1999). In the 16th and 17th centuries, artists like Arcimboldo (Gage, 1993; in van Campen, 1999) and thinkers like André Félibien, historiographer and architect, (Jewanski, 1999) produced scales systems and theories on the relationship between colours and sounds. In the 18th and 19th centuries, instrument makers started to build machines and instruments that could stimulate simultaneously both the aural and the visual senses. They are the first examples of interactive machines with which it was possible to create an abstract audio/visual composition in real time where the relationship between the colours and the notes was predetermined by the builder of the instrument and based on some mathematical or perceptual system. These instruments were often called colour organs, and summaries of their history can be found in papers by Kennet Peacock (Peacock, 1991). Colour organs were built by Louis-Bertrand Castel (Clavicin Oculaire), D. D. Jameson, Bainbridge Bishop, A. Wallace Rimington, Frederick Castner (Pyrophone), and Thomas Wilfred (Clavilux). The term colour organ was first used in a patent application by Rimington in 1893 (Peacock, 1988). These instruments often looked like typical musical instruments, but when played they controlled coloured gas lamps or coloured paper strips lit by candles.

Recently, digital technology for manipulation of audio/visual material has become easily affordable, and a new generation of artists is starting to simultaneously combine and control materials (audio and visual) that only a few years ago were considered to belong to completely different art practices. Many laboratories and academies like the International Academy for Media Arts and Science in Ogaki-shi, Japan; the Center for Culture and Communication and the Intermedia Section of the Academy of Art in Budapest; the Zentrum für Kunst und Medientechnologie (ZKM) in Karlsruhe; and the Academy of Media Arts in Cologne, Germany, have made their syllabi based on the permanent crossing of boundaries between media and art forms (Zelinsky, 1999).

AUDIOVISUAL ART IN THE COSTART PROJECT

In January 2003 at the Creativity and Cognition Research Studios of Loughborough University, the second part of an innovative research project in art and technology, called COSTART, began (Candy and Edmonds, 2002a). The two-fold aim of the project was to study the impact of collaborations between artists and technologists on the creative process and on the development of new technology. Ten artists were approached and invited to submit technically challenging proposals to be implemented during the residencies. Technologists knowledgeable in both art practice and research, and digital technology worked in collaboration with the artists to implement the projects.

Adriano Abbado

Italian artist Adriano Abbado started his career studying electronic music at the Conservatory of Milan. His work with synthesised sounds led him to search for a way to visualise them as a method to classify them. Adriano writes: "The process of categorization has been at the centre of my interest for many years. I faced the issue when, once creating many synthetic sounds, I had to sort them perceptually to organise my work." (in Candy and Edmonds, 2002b). This search, born as a musical necessity, proved very interesting and became a research project on the relationship between synthetic sounds and abstract animation, which is well documented in Adriano's Masters Thesis, Perceptual Correspondences of Abstract Animation and Synthetic Sound (Abbado, 1988). Abbado identifies timbre as the most interesting and complex parameter that encapsulates what in electronic music today we call musical objects (any sort of sound, complex or simple). In the visual context, shape defines objects. There is then a correspondence between the spatial position of the visual object and the position from which the sound is produced.

The techniques of spatialisation of sound allow the reproduction of sound movement in space. The size of the shape is in correlation with the sound location. The brightness of a visual object is related to the loudness of the sound. The amplitude envelope of a sound (in

particular the attack) is an important element of the timbre of sound.

When Abbado came to the Creativity and Cognition Studios, he had the opportunity to use new technology for interaction based on sensors. He decided to concentrate on his audio/visual concept concerning noise. On this subject, he writes: "One of the correspondences that I find easier to set is the one between visual and aural noise. The concept of noise has interested me for a long time: I like the idea of emissive and absorbent objects: light and sound sources, on one hand, and filters on the other. Combining the two things is straightforward: filtered noise." (in Candy and Edmonds, 2002b). Using his system of correspondences between sound and visual perceptual parameters, he produced synthesised sound objects of variously filtered noise. He then created corresponding digital images. These objects form two separate sets of sequences, some audio and some visual. The sequences have higher and lower density of events per unit of time. Two ultrasonic proximity sensors allow the user to interact with the stream of audio/visual events projected on a screen and diffused by two loud speakers. A person in front of the screen can control the aural stream and the visual stream independently, by moving both hands closer and farther away from the two sensors placed on the floor. The audience can control the balance of sound to images in the audio/visual stream.

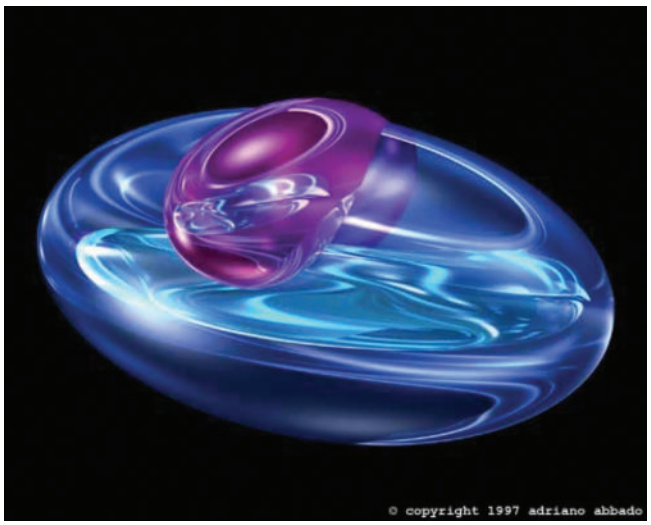

Figure 1: An Abado image typical of those used

Jack Ox

The work of American artist Jack Ox focuses on "translating" music compositions into visual works. A recent project is The 21st Century Virtual Color Organ, a collaborative project between technologist David Britton and the artist. Ox selects musical compositions, normally not composed purposely for her work, and creates digital visual representations of them based on a system of strict correspondences between musical and visual parameters. These representations are then placed and experienced in interactive, immersive, virtual reality environments. The 21st Century Virtual Color Organ is the computational system for translating the musical compositions into visual performance. It uses the information about sound that can be gathered from the MIDI files to produce 3D visual images. Britton is responsible for the graphics programming and the meta-architecture of the programming structure. Ox contributes to the concept, visual images, musical analysis, visualisation systems, and texture maps. There are two basic visual levels: the background visual environment where the sound and visual objects live and the objects themselves. One example of background visual environment is based on images gathered by making very-high-resolution photos and then detailed pencil drawings in the studio, which are scanned into the computer.

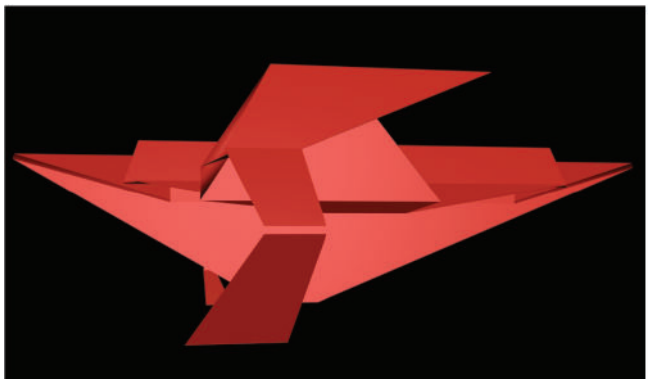

Figure 2: One of Jack Ox's images generated in the COSTART residency

The relationship between the music and the choice of these images is based on a metaphorical correspondence. For example, eight different desert landscapes are photographed, and each one is connected to a particular family of instruments. The sound and visual objects are created by applying a transparent layer of colour over the landscape image. Embedded polygons are created over the virtual desert by playing MIDI files. The characteristics of the MIDI files determine the shape and colour of these objects. A recent colour system created by the artists is based on timbre. During her COSTART residency, Jack Ox produced many 3D models (using the software 3d studio max) of objects corresponding to the sound files created by composer Alvin Curran for her next performance, called Gridjam, an interactive piece in which the participants have the opportunity to "jam" together by triggering the sound files and their corresponding visual objects.

Yasunao Tone

Japanese artist Yasunao Tone's background is in music and performance. He was part of the Fluxus art movement of the 1960s, and his work is rooted in the concept of "Intermedia" defined by Dick Higgings in 1966 (Higgings, 1966), where different media are fused together by integrating elements from different environments into one structure. Tone's recent work is an exploration of new relationships among text, sound, and images. As a starting point, he uses Japanese poems written with Chinese characters. Already in themselves they are a fusion among sound (the spoken text), images (the images of the Chinese characters (ideograms), the images evoked by the poems, and the meaning of the text. Tone does not create a

system of correspondences among sound, images, and words external and applicable to different art works. Instead, he converts one medium into another, images into sounds, and brings to life the sounds that are intrinsic to an image, just as sound, image, and meaning are intrinsic to a Chinese character.

Figure 3: A still from the video illustration of Tone performing with the Soft-board

In Molecular Music (1982-85), light-sensors arranged by the composer on the surface of a projection screen interpret the visual form of a projected image and send that information to sound-producing instruments (Ashley, 1993). Digital technology proves to be central to Tone's work, as he explains: "The digitizing process equates all the differences from the sources like visual, auditory, and textual materials with the same binary codes. Therefore, conversion among text, sound, and image has an inherent necessity for digital technology." (Candy and Edmonds, 2002). During his COSTART residency, Tone had the opportunity to add a live-performance dimension to this kind of work. Technologist Mark Fell knew the artist's work and proposed thathe use a "softboard" as a performance instrument. A softboard looks like a normal white board, but the movements of the pen can be tracked and sent as digital information to a computer. The software Max/MSP was used to read the data from the softboard and convert them to XY coordinates. These coordinates then identify a pixel of a chosen image. The digital data coming from the pixel (for example, brightness) and the XY coordinates control the parameters of sound synthesized in real time with the same software. Tone drew the Chinese characters onto the softboard, and his strokes were immediately converted into sound, creating a performance that impressed the team by its relentless searching through the sound and imagescape of the piece.

Ernest Edmonds

Ernest Edmonds' abstract visual work is time-based and uses generative procedures that relate closely to those often used in music today (Edmonds, 2003). A series of collaborations have taken place throughout the 1990s and beyond, in which composers have worked with him to make audio/visual abstract performance pieces. The underlying concepts for all of these works is that a single structural form generates both audio and visual representations. These audio and visual representations are not necessarily equivalent. They need not have a one-to-one mapping, but they are part of the same underlying generative structure. Mark Fell, a member of the COSTART technology team, is also a sound artist and is the most recent collaborator with Edmonds.

Four "works in progress" have been composed to date. In each case, a generative system was implemented in Max/MSP that produced a sequence of vectors according to a particular set of rules. The programs incorporated two sets of parallel mappings from these vectors to image and sound data. The implicit correspondences between audio and visual information are not intended to correspond to any particular physical or psychological theory. Rather, they constitute the specific aesthetic of the given work. In both domains, the style is very minimal and the works can be seen in part as developments from the "systems art" tradition (Bann, 1972). For example, the visual element might consist of a changing display between one and eight stripes of closely related colours. In one case, there are just two stripes, and the saturation gradually increases during the piece whilst the hues are selected by the generative system, and the brightness of each stripe is under the direct control of a different performer, the audio parameters being treated in a parallel manner.

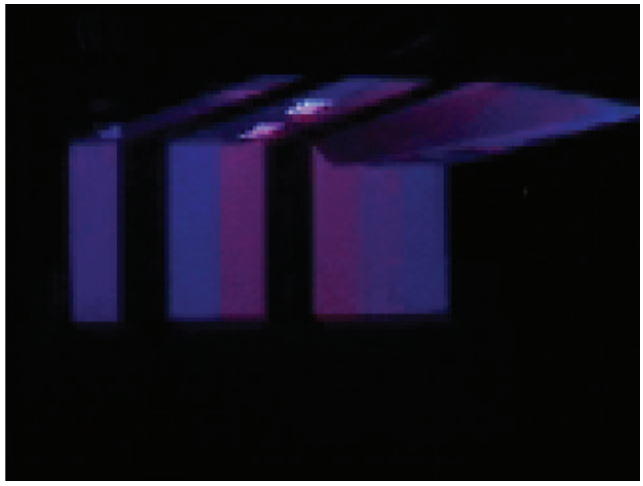

Figure 4: A still from the performance of one of Edmonds' and Fell's works

DISCUSSION

Film and television relate the audio and visual mostly to form a narrative. Audio/visual works such as those developed during COSTART are abstract and do not represent some possible reality outside the work, such as the sea or a landscape. The relationship between audio and visual parameters can be mathematical, metaphorical, or intuitive. In some cases, the digital source used to synthesise the audio is used to synthesise the visual as well. Audiovisual works exist in a space of possibilities (Figures 5 and 6).

We can distinguish between interactive works and non-interactive works. Films are examples of non-interactive works in which the audience cannot change the flow of the audio/visual material, while, for example, Abbado's Interactive Noise is a piece centred on the possibility for the audience to interact with the audio and visual material and, therefore, experience how these two aspects of the same piece interact with each other. There are different ways for the interaction to occur: the audience or the performer can be allowed direct interaction with only the audio or the visual material, and then, respectively, visual and audio are generated as a consequence. There can be interaction with the audio/visual object as a whole, or direct interaction separately with the audio or the visual material can generate a combined response.

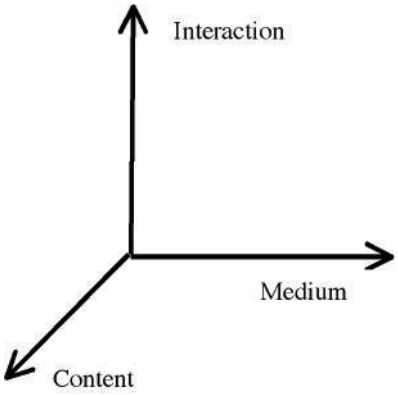

Figure 5: A space in which to place audiovisual works

These different approaches represent ways of exploring, using, and manipulating the same theme: the relationship between audio and visual and how we perceive it as a whole. In this context, the computer appears to be a very flexible and open instrument for manipulating and integrating audio/visual material. The computer can be considered the audio/visual instrument par excellence because of the transformation of both audio and visual material into the same type of digital information. This sort of new equation of the two fields allows the treatment of audio/visual material as a whole and, as such, opens new exciting challenges for digital artists. The recent development of software for the integration of audio, visual, and interaction is also proof of the contemporary interest in multimedia or "intermedia" art works. The audio/visual works developed during COSTART not only represent different creative approaches to the audio/visual theme, they also explore the flexibility of digital technology in this context.

Interaction: none/audience/media/both
Medium: still image/moving image/sound/audio/visual
Content: narrative/sound from image/image from sound/audio/visual

Figure 6: The three dimensions of the audiovisual space

CONCLUSION

There is a significant history of the evolution of the relationship between the aural and the visual realms. It is a history of scientific discoveries, evolution of technology, perception studies, and artistic outcomes. Technology developments in the 20th century and, in particular, the development of digital technology, have made finally explicit what we call the audio/visual discourse. The panorama of artistic works that can be placed inside this discourse is not at all uniform either in terms of form, content, or media used. The authors have attempted in this paper to outline a broad classification in order to show how very different artworks can be considered part of the same artistic discourse. Finally, attention is focused on the art projects developed around the COSTART Project as examples of artists' concerns and their particular use of digital technology as the chosen instrument to produce such works.

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Interface as Image: Image Making and Mixed Reality

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ABSTRACT
This paper will explore the use of the graphical user interface as art, product and inspiration, drawing on my own practice as a digital image maker and installation artist, and a theoretical investigation of digital image making in hybrid art practice. As the boundaries and reference points between physical and digitally grounded imagery become less defined, the possible duality and interplay for a combined image space moves towards a seamless self-referencing and continuous activity. A visual feedback loop or strip, where the clues of originality become increasingly hard to differentiate and, perhaps, increasingly irrelevant, a state of "deterritorialisation."[1] Some thought will be given to examining the potential for mapping digitally grounded imagery into both two- and three-dimensional physical space to create a mixed-reality experience and to what can happen when we extract the real-world metaphors from the digital environment and take them back into the physical world. Questions about the transparency of the human/computer interface, and about just how transparent we really want this to be, are also raised. What are we left with when we remove the content from the graphical user interface? What traces of human interaction (from the physical) become evident, and what are the "aid memoirs" we employ to assist us in navigation and colonization of the digital landscape?

Keywords
Hybrid practices, digital image making, augmented realities.

Digital print from "transience series"
Title: "pool-elevate" 2003

Realities within Realities

In his essay, "The Metaphysics of Virtual Reality," Michael Heim, the digital-media theorist, discusses the need we have to "create realities within realities," (Heim, 1991) and how suspension of belief in literary, artistic, and film narrative allows us to enter into another set of constructed realities. Further, Heim debates the reality of reality itself being made up of different interpretations from science, religion, and the arts, all interacting with each other and building (or replacing elements) to produce a reality that is in constant flux and revision. A move away from the "unique reality of a single fixed world" to the notion of the "world as a plurality" (Heim, 1991). The idea that VR spaces are inherently non-spaces (in the sense that they are visually coded from nothing), as opposed to the real world that is already "full" and "ready-made" is put forward by Moser (1996) in her essay "Nature Morte: Landscape and Narrative in Virtual Environments." Suggesting that symbolic and visual representations need to be generated to populate the empty-picture plain of virtual reality, Moser goes on to discuss the inherent difficulty in transferring cultural objects and significance from the physical to the virtual and from one part of cyberspace to another. And she is prompted to ask the question: "Why produce virtual environments at all when we could be enjoying a far more satisfying and beautiful physical reality?" (Moser, 1996). Although, Baudrillard's notion of the simulacra suggests that many public spaces, through a constant refashioning and layering, have already been remediated to such an extent that they are almost a physical manifestation of cyberspace. Themed restaurants, shopping malls, adventure parks, and experiential museum rides are all physical manifestations of a hypermediated experience that often incorporate heterogeneous media interpretations to bolster and legitimise the illusion (Bolter & Grusin, 1999).

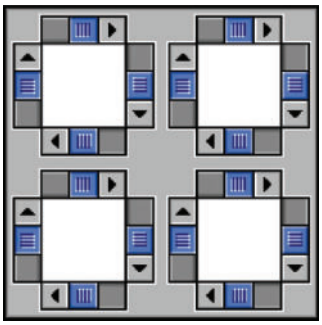
Cleaning and repairing Brisbane's man-made city beach. Brisbane is surrounded by the famous white sand beaches of Queenslands central cost (Gwilt, 2003).

Digital print from "transience series"
Title: "light_matt_urban" 2003

Complex Media and Image Exchange

Bolter and Grusin (1999) discuss the idea of the transference of the image from one medium to another and the associated cultural and semantic implications associated with this activity, laying out the premise that the remediated experience (throughout media both old and new) is made up of the contradictory duality of immediacy and hypermediacy. The notion of immediacy refers to the live point of view, reportage and voyeuristic tendencies in the presentation of media. A transparent experience where the nature of the delivery medium disappears and the content and experience are the main focus. "Immediacy dictates that the medium itself should disappear and leave us in the presence of the thing represented" (Bolter & Grusin, 1999). Yet this very experience is undeniably linked to the

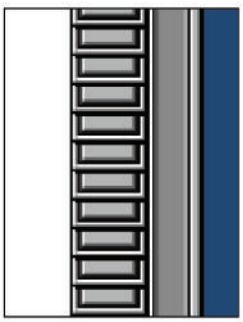
nuances of the delivery media (hypermediacy), from the texture of paint on canvas to the split-screen television news interview and the screen architecture of browser navigation devices inherent in web-based communication. This is particularly evident in digital media where we may have a combination of layered information sources in the form of text, image, video, animation, spoken narration, and music. The experience is embedded in the very nature of the content delivery, and often as observers or participants in a mediated artwork we might want or need to see the interface, as well as have the ability to look through it. "This is the most important lesson, perhaps, that digital art has to offer … an interface can be not only a window but also a mirror …" (Bolter & Gromala, 2002).



Digital print from "memories from the interface series"
Title: "Scrolling-heaven" 2001

Desktop Icons: Transparency or Opacity

Intrinsically, when we engage with digitally produced, hypermediated spaces, we are invited to engage with not only the subject contents but also the medium itself. Often the process of disseminating the digital media contains technological faults such as lags, interruptions, and breakdowns, which have in themselves become part of the architectural language of the media (Bolter & Grusin, 1999). Contemporary film titles will on occasion employ effects and filters that emulate distortion and signal break-up as part of a visual aesthetic. Indeed digitally generated hypermediated platforms frequently emulate pre-digital-media nuances to demonstrate a particular style or sensation reminiscent of analogue media. Digitally recorded music often has simulated scratches included, a reference to the age of vinyl records. Animated visual indicators of bandwidth (lags) and signal-strength (interruptions) are common components in the graphical user interface (GUI). Transferring and recording this frailty of digital media offers an often-exploited opportunity in digital image making.



Digital print from "memories from the interface series"
Title: "Stutter" 2002

Another interesting source of visual material for digitally referenced image making can be found in the rise in popularity of the desktop interface and the metaphors of folders, files, trash bins etc., which are designed to allow a more seamless transition between the real-world office environment and the virtual workspace. The replacement of the computer code command-line input has opened the way for interaction with a broader audience. The familiarity with the metaphorical GUI is intended to further give the user a sense of immediacy and enable one to look past the medium altogether, to simulate a sense of the empirical experience through a denial of the media and mediation (Bolter & Grusin, 1999). However, a contrary argument suggests that we are constantly presented with the interface through the interplay and arrangement of complex digital media, which necessitates interaction with navigational architectures of multiple windows, graphic icons, and hypertext. The suggestion that these devices and metaphors are dependent on the cultural significance assigned to them in a grounded social context is supported by the media theorist Mieke Bal (2003). Bal sees all real-world artifacts grounded in historicity and social anchoring, and asks the question: How do we look at "post material" objects? And invest in them the same cultural veracity we reserve for physical originality and realism – imbued with notions of faithful representation and authenticity?

Digital print from "memories from the interface series"
Title: "red-trash" 2002

Is it possible to read heterogeneous content without the systems employed within the GUI and digital media navigation? Or are the graphic devices of the GUI in fact an essential component to the understanding of remediated content, allowing us to differentiate between media iterations and to "control the discontinuities as the user moves amongst the media" (Bolter & Grusin, 1999).

Digital print of 3D model (left) and Rapid Prototype Sculpture (right)
Title: "scrolling-heaven-3D" 2002

Representation and Digital Media

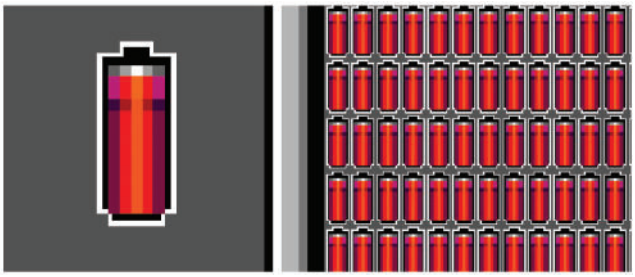
Digitally referenced images often address the sometimes conflicting issues of realistic representation on the one hand and artistic expression and abstraction on the other. As the invention of the camera and subsequent movements in modernism released the artist from the need to represent the actual, perhaps the arrival of ubiquitous digital technologies and postmodern theories have released the need for digital image makers to reference the real. Digital media artists such as Troy Innocent, Jon McCormack, and Paul Brown produce works from a purely virtual environment creating computer-generated imagery, often generatively realised and based upon computational equations seen through the unnatural glow of the computer monitor. John McCormack describes his 1994 work "Turbulence" as "an evolutionary landscape made possible by technology – a digital "poiesis" (Tofts et al., 2003). And he questions the role and ability of synthetic environments to recreate or replace the physical, whilst on the other hand, also alerting us to the potential "celebration of the beauty to come" (Tofts et al., 2003).

Hybrid Art Spaces

Perhaps this dissatisfaction with the ability of the digital image to transmit the "aura" of a physical artifact has led to a recent trend in which we see a number of artists working in a hybrid space, referencing aspects of the real or tangible world, in conjunction with the utilisation of computer-driven technologies and digital-media opportunities. Creating work that is interdependent on the experience of the two environments – an experience that goes beyond the attempted replacement of one space with the other but which is only fully realisable by the augmented combination of both. Furthermore, configuring spaces and experiences that attempt to place the viewer in both the real world and a virtual environment at the same time, and even encouraging the transient movement between these spaces. Some of these ideas are evident in Troy Innocent's recent works, where virtual entities are manifest in the real world as physical sculptures that have a seductively smooth-surfaced tangibility and which, when interacted with, project and emit images and sounds that hint at their digital genealogy.[2]

Gallery proposal image for "Scrolling_heaven" installation:
(Video animation, digital prints, Rapid prototype model) 2002

Interestingly, in his book *Virtual Art: from illusion to immersion* Oliver Grau states that "in addition to copying it (reality), the transformation of reality is the central domain and essence of art: the creation of reality, individual reality, collective reality" (Grau, 2003). Further underlining the potential for digital art to reflect multiple realities, Margot Lovejoy asks us in her seminal book *Postmodern Currents: Art and Artists in the Age of Electronic Media* to consider what it means when new "hyperalities can be created" through the use of a computer? What is the potential for image making when the image source is stored in a database? And "what is the role of the artist in an interactive artwork which invites the collaboration of the public to complete its meaning?" (Lovejoy, 1997).



Digital print from "memories from the interface series"
Title: "oneofmany-recharges" 2002

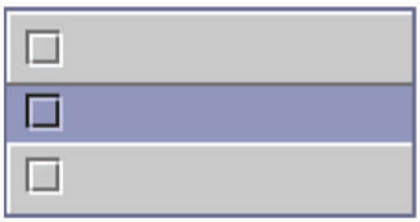
The Mimetic Vs. the Nonrepresentational

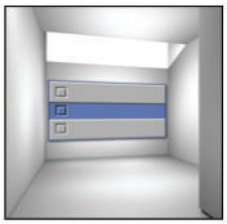
As technology drives toward the seemingly perfect photographic rendering of the real world, are we somehow missing the point? Heim states: "A virtual world can only be virtual as long as we can contrast it with the real (anchored) world." And: "A virtual world needs to be not-quite-real or it will lessen the pull on imagination." (Heim, 1991). The less than real allows us to imagine and visualise – take what we receive – see, hear, or read and create a symbolic construct or mental picture. "Imagination leaves behind the limits of our physical existence," and, as such, "imagination is not reality" (Heim, 1991).

Cyberspace and VR are perfect examples of constructed environments where we are invited to interact and use our imaginations. And in the context of creative digital image making, this invitation offers a multitude of opportunities that go beyond the notion of photorealistic representation.

Photorealism is a goal that is often sought in computer graphics. And to some extent, this has already been achieved with the likes of "Final Fantasy," the movie, and computer-generated sequences that are virtually impossible to detect when they are segued into real-action films . However, this simulation of reality is only ever possible in a limited sense and as a limited replication if we take onboard the postmodern notions of hyperrealities and simulacrum. Although they are potentially visually accurate, what are the semantic implications or associations with these remediated images? As Benjamin Woolley purports, is it the case that "reality is a cultural artifact …" and that "virtual realities are real by virtue of our interaction with them, rather than by virtual of what they are" (Woolley, 1992). This argument again suggests that there are other possibilities for the digital imager maker beyond the attempted replication of visual reality. Should we also be considering issues of subjectivity, ownership, and control within virtual environments? Moser suggests that cyberspace is not only a "scenic space where things could happen," it also includes "the artificial intelligence or agency that orchestrates the virtual scene" (Moser,

1996). And furthermore, that this agency can be imbued with characteristics, preferences, and interpretations that influence and control the experience of the participant. Drawing on Moser's ideas it is possible to see parallels between the interpretative role of artist as painter and the "art" of the virtual environment space maker in that they both represent and present a subjected interpretation of reality. In fact, Moser and others suggest that the role of art in the virtual is to add to, or raise questions of, subjectivity and social context (Moser, 1996).





Digital print from the "no presence" series
Title: "a_good_choice" 2002

Beyond Binary: The Feedback Loop

Why has this intermediate space between reality and the digital virtual become fashionable for both technologist and artists to explore? Perhaps, according to Robert Pepperell and Michael Punt:

This is a timely reminder that the digital age is transitional and quite possibly short-lived. Whilst the power of digital processing to model and control complex systems seems beyond challenge, we will overlook its weaknesses. These lie in the inherent inflexibility of the binary encoding of information which is limited to all or nothing, on or off (Pepperell & Punt, 2000).

In his writings about hyperrealities and the feedback loop, Woolley cites Baudrillard and his notions of the simulacrum, building on the concept of the simulated world referencing and replicated the physical world, which in itself (through the onset of pervasive digital technologies and media) has become a fabrication, a hyperreality. This idea is illustrated in a reference to a Jorge Luis Borges story where a mythical kingdom is replaced by a map (at 1:1 scale) of the same kingdom. The map becomes th reality, and, further, the kingdom begins to reshape to fit within the definition of the map. This continuous, evolving referential activity between the perceived real and the virtual interpretation is a key feature of the potential for augmented reality. Wolley expands his argument through the ideas of N. Katherine Hayles and her notion of the referential feedback within systems as well as between systems. "Feedback loops among theory, technology, and culture, develop and expand into complex connections between literature and science which are mediated through the whole cultural matrix" (Woolley, 1992).

Another possible explanation for the current interest in mixed-reality arts is the potential for hybrid spaces to deal with ideas of the self. Mixed realities allow us to exist in both a physical and digital space at the same time. We can hold onto the physicality of our corporeal bodies and associated sense of time, space, and consciousness without the prescriptive outer-body experience implicit in an Immersive VR experience. And yet at the same time, we can indulge in the post-real potentials of hybrid digital media: warping time, scale, narrative, and other metaphysical experiences difficult to visualise or dangerous to explore within our mortal bodies. Mixed-reality art allows us to incorporate both the mediated and empiric experience, moving between and synthesising the two to facilitate an augmented experience that is not offered by the virtual or real alone. Perhaps the concerns raised by Mark Slouka regarding the virtualisation of the real are representative of the current backlash to immersive virtual reality and the growing interest in virtual/real mediated spaces and hybrid image-making practices: "There was something vaguely nightmarish about this hunger for transcendence, this lust for dissolution, this utter lack of loyalty to the earth, the body, the human community" (Slouka, 1995).

NOTES:

1. This term is used by Pierre Levy when he talks about the "contemporary multiplication of spaces" affecting the way we exist – disenfranchising us from the here and now and making the interface between the real and virtual more fluid. This breakdown in the importance of relying on or ability to rely on a sense of place and a move toward a state of multiple senses of place Levy calls the process of "deterritorialisation."
2. You can see an extensive presentation of Troy Innocent's work at www.iconica.org/main.htm

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The Noetic Connection: Synesthesia, Psychedelics, and Language

Everything is deeply intertwingled. **-Ted Nelson**

ABSTRACT
The literatures that touch on synaesthesias – scientific, art-historical, literary, phenomenological, ethnographic, psychedelic – vary widely in their definitions, their interpretations, and their degree of comfort with the first-person, subjective nature of experiential reports. The *significances* given to synesthetic experiences are similarly wide-ranging. This paper explores the relationships among synaesthesias, psychedelic experience, and language, highlighting Terence McKenna's synesthetic language experiences on DMT and magic mushrooms. We describe the complexities of creating and performing with the Synestheater, a system that provides the means to weave together, in multiple mappings, two or more complex visual, aural, and linguistic systems in live performance.

Introduction

Contemporary neuroscience (Cytowic, Marks, Harrison) views synaesthesia as a rare, (perhaps abnormal, perhaps pathological) "condition." Visionary artists, (Blake, Scriabin, Kandinsky, the French symbolists) link synesthetic perception to a spiritual dimension. The phenomenologist David Abram, based in Merleau-Ponty, the phenomenologist of perception, locates synaesthesia as fundamental to perception and language, both spoken and written. Ethnographic reports of ayahuasca shamanism in the Amazonian rain forest (Luna, Amaringo) describe the centrality of the *icaros*, the shaman's songs, that guide and create the content of the visionary experience on many levels, calling visual forms and presences into being with sound. Reports of psychedelic synaesthesias (James, Pankhe, McKenna, Munn, Narby) link the states of multisensory perception to noetic experience of deep insights into the nature of reality and consciousness, and their profound intertwinglement. A range of contemporary artistic practices, especially in immersive, interactive, electronic media environments seek to create, or invoke, synaesthesias. The psychedelic connections to the creation and participation in many of these experiences (rave culture, Burning Man), and their enabling technologies, such as computer graphics, are common knowledge.

This paper details one example of such artistic experimentation. The Synestheater is a software implementation that can link the sensory qualities of two or more intricate systems, each producing complex, aesthetic forms in differing sensory modalities through an intermediate zone (the intertwingulator) where mappings can be constructed and tested in performance. The Glide system of dynamic, multidimensional visual language is mapped to keyboard input from a MIDI synthesizer or from the EIS (Expanded Instrumentation System) to create a variety of synesthetic performances. The collaborators acknowledge the dual difficulties: technological and aesthetic. Making it work on the one hand and designing and performing a meaningful aesthetic experience with these highly complex instruments are interdependent challenges.

Neologisms in Ancient Geek

Xanadu never shipped, but Ted Nelson's word still bears fruit, now in the context of synaesthesia. *Intertwingle*: itself a blended word (to say it is to do it: noeto-poetic?), a braid of intertwining, mingling, perhaps twisting together, the deepness of which suggests the mycelial networks of brain and WWW; the immersive, multisensory bombardment of a rave; googling around the fractal depths of contemporary dataspaces; navigating by synchronicities, "hints and allegations;" dense heterarchies of meaning emerging and dissolving; connecting paths and patterns, linkings, unlinkings. And this theme of *intertwingularity* is the common ground underlying the discourses of synaesthesia, whatever the variances among epistemological theme parks, or the bewildering richness person to person in experiential reports, whether those reports are quoted in neuroscientific works, the Vaults of Erowid, William Blake's visions, or the heavenly or hellish trip reports of Aldous Huxley.

A Synaesthetic Sampler

"Sounds seem to affect what I see. I see music; the textures of rhythms and the colors of melodies float before my eyes ... My visual images alter or change whenever I hear a sound or noise … Sight, feeling, motion, texture, thinking, sound – all are one … The interaction between sight, music, and physical feeling is most remarkable." (Dobkin de Rios, p. 48.)

"When I get there I lie down with my eyes closed and sunglasses on, there is some interesting synaesthesia going on, corresponding patterns in regards to distance and volume and other characteristics of the sounds I hear. The most interesting 'looking' sound comes from a moped that passes by on the bike road below the hill." (DOM, Vaults of Erowid)

"I experienced powerful synaesthesia between hearing and touch. I ran my hands over the sharp edges of the springs underneath my girlfriend's bed and simultaneously heard, felt, and saw an intense static/sharp/bright sensation." (5-MeO-DMT, Vaults of Erowid)

"Your name, Richard, tastes like a chocolate bar," she writes, "warm and melting on my tongue." (Cytowic, p. 14)

"The spirits one sees in hallucinations are three-dimensional, sound-emitting images. In other words, they are made of their own language, like DNA." (Narby, p. 71)

"Through his *icaro*, he also calls the rainbow with the whole range of colors that the *boa yakumama* has. He sings the *icaro* of the diamond, the gold, the silver, and of all the precious stones in order to put them on the woman to protect her …" (Luna, p. 112.)

"The first thing I saw was the 'visible language'! … The 'elves'

appeared. They sang/l saw/read/felt/heard. They are 'made out' of the visible language. The message is conveyed by the medium itself in several simultaneous sensory modalities." (DMT, Vaults of Erowid)

"The ancient wise men, to describe the kaleidoscopic illuminations of their shamanistic nights, drew an analogy between the inside and the outside and formed a word that related the spectrum colors created by the sunshine in the spray of waterfalls and the mists of the morning to their conscious experiences of ecstatic enlightenment: these are the whirlwinds he speaks of, gyrating configurations of iridescent lights that appear to him as he speaks, turned round and round and round himself by the turbulent winds of the spirit." (Munn)

The Noetic Disconnection

From this small sampling of quotes, it seems clear that under the broad rubric of "synaesthesia" almost any sensory – and/or emotional – and/or cognitive experience can be cross-linked. Neuroscientist Richard Cytowic narrows the definition of synaesthesia to:

> the involuntary physical experience of a cross-modal association. That is, the stimulation of one sensory modality reliably causes a perception in one or more different senses. Its phenomenology clearly distinguishes it from metaphor, literary tropes, sound symbolism, and deliberate artistic contrivances that sometimes employ the term "synaesthesia" to describe their multisensory joinings.

Cytowic estimates the occurrence of the synaesthetic experience to be statistically rare, one in 25,000. When psychedelics are the testbed of synaesthesias, the occurrence of synaesthesias increases dramatically:

> It is reasonably common for individuals who take hallucinogens to report that their senses become mixed. Given the illicit nature of the topic it is hard to find reliable data on this issue, but a recent web-based questionnaire conducted by Don DeGracia suggested that, of a total of 62 respondents who admitted to using hallucinogenic compounds, 45.9% reported synaesthetic symptoms. Clearly the most common manifestation (over 90%) was to see sounds. Now, just as with the patients described in the last section, it would be prudent to treat such accounts with an element of caution, as it can be hard to dissociate "true" synaesthesia from possibly imagined forms of the condition." (Harrison)

Questioning the reality or validity of these experiences in the scientific discourses is common, and interesting ambivalences arise in the handling and evaluation of first person reports. On the one hand, Cytowic invokes *The Varieties of Religious Experience*, in which "William James spoke of ecstasy's four qualities of ineffability, passivity, noesis, and transience," claiming that: "These same qualities are shared by synaesthesia." Further, in the section titled "The Rejection of Direct Experience," Cytowic states that: "Questioning [synaesthesia's] reality without first having some technological confirmation shows how ready we are to reject any first-hand experience. We are addicted to the external and the rational. Our insistence on a third-person, 'objective' understanding of the world has just about swept aside all other forms of knowledge." At the same time, this very ineffability, is, for Cytowic, a bug not a feature. He sympathizes with Heinrich Kluver, who, in trying to get his subjects to report on their mescaline hallucinations, "was frustrated by the vagueness with which subjects described their experience, their eagerness to yield uncritically to cosmic or religious explanations, to 'interpret' or poetically embroider the experience in lieu of straightforward but concrete description, and their tendency to be overwhelmed and awed by the 'indescribableness' of their visions … *Similarly, once Kluver got his subjects past elaborating or, even worse, explaining what they saw …* " [emphasis added] Clearly the noetic aspect of the experience is to be edited out by the "phenomenological" psychologist. Cytowic's own example of pruning direct experience: "In explicating MW's description of mint, I distinguished between his factual description of curved, smooth, and cool tactile attributes, and his analogical explanation of the taste as 'cool glass columns.'" For Kluver, Cytowic, and Harrison, the scientist's subjects' data are inherently untrustworthy in some way, needing to be refined in such a way as to (conveniently) fit the categories established by the scientist for that experience. More significantly, perhaps, interpretation is the privilege of the scientist; profound noesis, often a part of synesthetic experience, psychedelic or otherwise, is stripped from the "primary experience," invalidated, and tamed by the scientific reduction of "only the facts."

The descriptive potency of natural language is put to the test in the discourses of synaesthesia and psychedelics.

> Hallucinogenic discourse, both of scientific and "recreational" nature, faced a similar rhetorical dilemma as the rest of the ecstatic traditions it responds to: It must report on an event which is in principle impossible to communicate. Writers of mystic experience from St. Theresa to William James have treated the unrepresentable character of mystic events to be the very hallmark of ecstasies. Hallucinogenic discourse faced a similar struggle in the effort to report on the knowledge beyond what Aldous Huxley (and Jim Morrison …) described as the "doors of perception." (Doyle)

The Noetic Connection

Jose Arguelles, in his analysis of William Blake, quotes the famous lines of Blake's adopted by Huxley to describe the psychedelic visionary state:

> If the doors of perception were cleansed, everything would appear to man as it is, infinite. For man has closed himself up, till he sees all things through narrow chinks of his cavern.

Arguelles gets to the heart of the synesthetic matter in this passage:

> History is the result of an overelaboration and separation of the senses. Blake's vision of man's natural condition and the condition man shall return to following the apocalyptic disclosure of the present era – is that of a psychosensory unity in which each

> sense is not a narrow chink walled off from the other senses but in a state of communication with them. This state of sensory interfusion, often referred to as synaesthesia, is presupposed by a consciousness in which body and soul are realized to be one, and in turn presupposes a social order so totally different from the present one that its closest approximation is to be found in the remnant of so-called primitive societies. (Arguelles)

David Abram, following Merleau-Ponty, finds this synesthetic unity in the very nature of perception itself.

> Although contemporary neuroscientists study "synaesthesia" – the overlap and blending of the senses – as though it were a rare or pathological experience to which only certain persons are prone (those who report it as "seeing sounds," "hearing colors," and the like), our primordial, preconceptual experience, as Merleau-Ponty makes evident, is *inherently* synaesthetic. The intertwining of sensory modalities seems unusual to us only to the extent that we have become estranged from our direct experience (and hence from our primordial contact with the entities and elements that surround us.) … Synaesthetic perception is the rule, and we are unaware of it only because scientific knowledge shifts the center of gravity of experience, so that we have unlearned how to see, hear, and generally speaking, feel, in order to deduce, from our bodily organization and the world as the physicist conceives it, what we are to see, hear, and feel. (Abram)

Walter Pahnke, of the famous "Good Friday" experiment in the heyday of Harvard psychedelic research, describes the noetic aspect of the psychedelic experience as one of it main features, along with synaesthesia:

> The Noetic Quality, as named by William James, is a feeling of insight or illumination that, on an intuitive, nonrational level and with a tremendous force of certainty, subjectively has the status of Ultimate Reality. This knowledge is not an increase of facts but is a gain in psychological, philosophical, or theological insight. (Pahnke)

Psychedelic Language

All language is psychedelic by definition, functioning to make manifest the mind, to bring thoughts, feelings, information, from the interior of one mind and make them available to be interiorized in another. David Porush calls this "Technologically Mediated Telepathy." And Porush, Abram, and Erik Davis all relate the story of how this psychedelic, originally synesthetic, oral language-making connected us deeply and reciprocally to our natural environment, a mutual be-speaking that was progressively lost when writing, and most particularly alphabetic writing, froze knowledge-making into eternal signs in rows on flat surfaces, signs you could come back to – and they hadn't changed. These signs deployed progressively deeper disconnections – among the senses, between time and space, between reason and emotion. The alphabet: the cybernetic technology that changed everything. Synaesthesia, in this light, comes to stand for the promise of reconnection, of noesis, of recovery of some long-lost unity, within ourselves, among ourselves, within the world. Psychedelics produce synaesthesias with a noetic quality, at intense, supersaturated, high-bandwidth delivery rates, as well as bringing tales of new forms of language that both create and express these altered states of consciousness. They may appeal to some deep longing for knowledge not delivered as information arranged in hierarchical tree structures, carefully categorized, 1.0, 1.1, 1.11, but arriving live and lively, gesturing, zany, perhaps, even alien. Terence McKenna's accounts of the DMT self-transforming machine elves made of language dispensing unbearably high-speed, condensed blasts of pure and extraordinarily alien gnosis, and the mushroom experiences reverberating with the *logos*, seen and heard in synaesthetic unity, weird as they are, have been reported, in varying forms, by many others. Do the reports of synaesthesias in the scientific literature of psychedelic-like weirdnesses ("Richard, your name is like chocolate melting in my mouth") leaking into baseline consciousness, (strangeness usually kept in bounds by the state-bound nature of other forms of consciousness – dreaming, meditating, drugs – according to Roland Fischer's model of mind-states) fascinate us in the same way? There are entire classes of synaesthesias attached to letters, numbers, flavored and colored linguistic objects. McKenna himself comes back to these language experiences time and again in his books and lectures: new forms of language perceived, theories of the evolution of language and consciousness catalyzed by psychedelics:

> Perhaps a human language is possible in which the intent of meaning is actually beheld in three-dimensional space. If this can happen on DMT, it means it is at least, under some circumstances, accessible to human beings. Given ten thousand years and high cultural involvement in such a talent, does anyone doubt that it could become a cultural convenience in the same way that mathematics or language has become a cultural convenience? (McKenna)

The Synestheater

Designing and building the Synestheater, an interface that couples two or more complex artistic systems, each organized around a different sensory modality (the aural, the visual, the kinesthetic (the linguistic in motion, gesturing) is challenging technically. But the mapping of aspects of the aural experience to properties of the visual experience in such a way that in performance an aesthetically satisfying experience is created is largely unexplored territory. We have, with the advent of sophisticated tools emerging from rapidly evolving technology based on the Protean sorcery of the CPU, come to a point where we are building new instruments – and instruments with which to build instruments – at a much faster rate than we are learning to play them in an artistically mature manner. How many years does it take to master a musical instrument? An abstract animation technique? How can they meaningfully link? How can our perceptions be re-educated to encompass multiple sensory modalities and make magic in these unexplored, complex, subtle, infinitely variable synaesthetic zones? And yet, we keep doing it, always on the verge of overwhelm, drowning, or going with the flow. As Terence McKenna put it: "Information is loose on planet three … Earth is a place where language has literally become alive." The cyberspirits

are out of the bottle. Chiasmatics 101. And if all knowledge ultimately comes down to what we sense, what new things will we know in what new ways when we get just a little more in control, not of the waves, but of our ability to stay on our feet on the surfboard as we ride the rainbow serpent down the wave-ways into the great unknown, reached by connecting new pathways in the mind?

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Thoughts on Hesse, Digital Art and Visual Music

Excerpts from the "Variations" artist statements (1999-2003)

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ABSTRACT
This essay describes the influence of Hermann Hesse's ideas on my creative work and how I create interactive music sculptures and visual music. In his book, *Magister Ludi*, Hesse describes a game in which art and music blend together in a way that allows for transformation of creative content into various forms of media. "Variations" is an ongoing exploration of interactive sculpture and visual music that began in 1999 and still continues. The following describes my thought process for early versions of this work, as well as for "Variations 03," an interactive music installation that was exhibited as part of the SIGGRAPH 2003 Art Gallery. My approach in creating this work was to develop a three-dimensional sound matrix that viewers could change as they interacted with the sculpture.

Theoretical Background

The following quotes will give some insight into why I chose to create art the way I do:

> I very often reread books that have made an impression on me. Several years ago, while on my way to the SIGGRAPH 94 computer graphics conference, I brought along a copy of *Magister Ludi* (also published under the title The Glass Bead Game) by Hermann Hesse to read on the plane. The following quotes stood out from the rest of the text and prompted me to stop and reevaluate my creative work and the field of digital art in general (Wands, 1999).
>
> In the formal game, the player sought to compose out of the objective content of every game, out of the mathematical, linguistic, musical, and other elements, as dense, coherent, and formally perfect a unity as possible ...
>
> One can be a musician or Glass Bead Game player and at the same time wholly devoted to rule and order. The kind of person we want to develop, the kind of person we aim to become, would at any time be able to exchange his discipline or art for any other.
>
> - Hermann Hesse, *Magister Ludi*
>
> Having a background as a musician, producer, photographer, and visual artist, I had long thought of myself as a Glass Bead Game player. As digital art continues to become the new art form of the next millennium, I am now even more convinced that Hesse's remarks were indeed prophetic. (After all, this book did win him the Nobel Prize for Literature in 1943.)

When I reread Hesse's novel, I was in the process of curating the Second Annual New York Digital Salon, and it struck me that digital art has a Glass Bead Game component to it. In the intervening years, there have been considerable advances in digital imaging, animation software, digital audio/video, and the global explosion of the internet. Access to this technology has become almost ubiquitous and artists are now frequently starting to branch out into media that were not their original primary focus: painters are creating web sites with interactive and textual components, while photographers are experimenting with video and 3D animation. The internet is also acting as a means of leveling the playing field for artists. It is an inclusive medium that allows text, images, sound, and video to be contained within a single artist's web site.

This branching out has positive and negative connotations for art. It is allowing artists more creative freedom and giving them access to new tools, but it runs the risk of enabling individuals to create work in media in which they do not have a well-developed vocabulary or aesthetic foundation. The question then arises as to whether the work created by these artists is a form of the Glass Bead Game or simply a byproduct of the curiosity of the creative imagination.

Despite the current sophistication in hardware and software, the fact remains that the fundamental element of digital art is data. All images, words, sounds, video, and text are ultimately reduced to a string of ones and zeros, stored in a digital file on the computer. On the transistor level, the circuit is either closed or open, in a sense coupled or uncoupled. Depending on the type of media stored, when the data are read by the computer they are converted by ASCII code to make text, image file formats to make visuals, or digital audio formats to make aural events.

Hesse's reference to the "formal game" can also be interpreted as referring to the computer, which makes visual, aural, and textual data as "dense, coherent, and formally perfect a unity as possible," not in the symbolic or intellectual sense, but in a practical way – to allow information to be stored and transferred from machine to machine, medium to medium. One of the benefits of digitizing creative work is that it provides artists a way to access and manipulate these data and to reinterpret the information within the context of their individual creative work (Wands, 1999).

Visual Music

Many artists and composers have been fascinated by the relationship between music and art. Artists have made visual interpretations of music, and musicians have employed color, images, and sound in their performances. Music is very efficacious at evoking moods and often stirs memories, resulting in various thoughts and often suggesting colors. When approaching the relationship between music and art, we can look at several issues: tempo, structure, composition, mathematical elements, and creative interpretation. My approach to creating visual music is to experiment with these various components as they relate to the specific musical passage.

Tempo can be looked at as the guiding force behind the amount of

detail or the density of the image. A slow tempo would suggest large shapes and very deliberate graphic elements. A fast tempo would imply the opposite, a fairly dense image with many components. These relate to how the eye looks at an image and how the ear interprets the sound. Fast tempos require a bit more concentration because there are many more notes in the music. Visually, the eye would be moving slowly or quickly across the image. Structure relates to the compositional forms used by the composer. Popular music is typically divided into verse, chorus, and bridge. Symphonies have several sections. The musical experience is by nature a temporal one. There is a beginning, middle, and end. Taking this further, there may be repeated passages and variations on particular themes. When applying these principles to a visual interpretation of the music, we now can look at repetition of form and characteristics of the music. For example, ascending and descending musical passages suggest lines or shapes that are rising and falling. A musical piece that repeats the same phrase throughout would suggest an image that has a repetitive motif in it.

Composition in this context relates to the style of the music and the instrumentation used. In other words, how the composer chooses the tempo and structure and then weaves it into the particular musical composition. This can take many forms depending on the cultural background of the composer and the composer's compositional approach. Classical music is very formal and has very distinct structures. Jazz is based on improvisation, and the music composition provides a jumping-off point for the musicians to read their own interpretation into the music. Taking these last two ideas into a visual interpretation, classical music might suggest a more precise type of image, whereas jazz may suggest a more abstract approach to the image.

While composition is a subjective process, the mathematical interpretation of music is a very analytical one. While leaving the door open to the musical interpretation of the work, the mathematical elements are easily quantified. This has been made easier by the introduction of MIDI (musical instrument digital interface). MIDI was developed in the mid-1980s by synthesizer manufacturers to allow different instruments to talk to each other. MIDI looks at music through several parameters: note on, note off, pitch, velocity, and after touch. This is radically different from the way music is stored on tape, on CDs, or as digital-audio files in the computer. CD and digital-audio files are stored in formats that relate to frequency and amplitude. A digital file of this type gives the listener an exact reproduction of the sound. However, digital-audio files do not give much to the artist. What one sees on the screen is a pattern that varies mainly with the amplitude of the music. There are several visual music software programs that give a visual depiction of the music. Taking this one step further, there are now software programs that allow one to "play" images in real time on the keyboard, along with the music.

Getting back to the mathematical analysis of a musical composition, MIDI has now made this process much easier. On a basic level, there are a definable number of notes in a musical piece. Their pitch and duration are quantified, along with the velocity and after touch (how hard the note is struck and how quickly or slowly the note is ended). By gathering these data, the visual artist can now deconstruct the music into a group of numbers that represent the music. Conversely, these numbers can now be manipulated by the artist into an image that carries the fundamental units of the music within it. For example, low notes can be large spheres and high notes can be smaller spheres. Or low notes can be darker colors, while higher notes can be lighter colors.

The final element to be considered when discussing visual music is creative interpretation. Although much of the above has related to the visual characteristics of the music and the underlying mathematics of the music, creative interpretation is the point where the artist must take liberties with the data to create a work of art that has aesthetic value. A simple visualization of the mathematical or structural elements of a musical piece is not art, just as a rote performance of music as it is written is not "real" music. It is the musician who makes the sheet music turn into the musical experience. It is the artist who must take all of these elements of the music and turn them into art. Visual music can take the many forms that art has available to it. Visual music has been interpreted into sculptures, images. and animation.

Continuing from the Leonardo essay: "I would like to refer to my own creative work as another example of the deliberate use of the synesthetic approach of coupling and uncoupling data and sensory information with meaning as a tool for inspiration." I am currently working on a series of interactive musical sculptures, and the following describes my creative thought process for "Variations 03," an interactive music installation that was exhibited in the SIGGRAPH 2003 Art Gallery, and for visual music in general. My approach in creating this work was to develop a three-dimensional sound matrix that was changeable by viewers as they interact with the sculpture.

The first step in the process was to look at the musical phrase in terms of its mathematical content. I counted the number of musical measures and the number and pitch of the notes to develop a mathematical representation of the musical phrase.

My next step will be to translate the score into MIDI data through a performance of the work, to allow myself a closer look at the musical interpretation aspects of the piece. Having the data in MIDI format now allows me to digitally control the performance to produce a large number of variations on this theme. For example, by speeding up and slowing down the tempo and by using a wide range of instrumental voices to play the musical phrase, I can hear it in many different ways. By creating these variations, I can explore the underlying rhythms and structure of the music from an aural point of view.

Once this has been accomplished, I will look at the graphic elements of the music. Musical notation is by nature a visual picture of sound. One of the shortcomings of musical notation is that it evolved in a period of acoustic instrumentation. Although open to interpretation by various musicians, the palette of instruments available at the time was limited. Several new notation systems have been developed over the past several years for electronic and digital music, although no

standard has emerged; these new systems are more often that not a way for individual composers to visually document their music. In my case, the original score will be translated into a 3D software package based on the number, pitch, and duration of the notes. I will use the numeric data as supplied by the MIDI file. In addition, I usually sketch ideas while listening to the various interpretations I have recorded of the musical phrase.

Out of this process, a visual picture of the music starts to emerge, and a design for the sculpture. The music has evolved from the written score to a MIDI performance with numerous interpretations to color sketches made while listening to the music; from there it develops into a three-dimensional database. This database allows me to visually play with the data, the same way that I played with it musically. I can apply different geometrical shapes and color to the data, and can view the data from a variety of viewpoints (notes from the score are translated into MIDI data and then entered into Alias PowerAnimator software). I will use this same process with the data generated from the music, which will generate a design for a sculpture (Wands, 1999).

CONCLUSION

Digital art allows artists more creative freedom. For example, music data can be re-interpreted as an image or sculpture and vice versa. My goal in creating "Variations 03" was to open the viewer's imagination. Rather than hearing a single recorded interpretation of the music, viewers now hear several instrumental interpretations. They also see an artistic interpretation of the music in abstract imagery and/or interact with a sculptural interface. The Glass Bead Game invented by Hermann Hesse allows for symbolic transformation of the original creative inspiration of a work of art, music, or literature into the various art forms and media that artists create. One of the purposes of art is to change the viewer's perception. It is hoped that after viewers experience "Variations 03 they will think differently about music, sculpture, and art.

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Artist Round Tables

Researching the Future: (CAiiA-STAR and the Planetary Collegium)

Taking the Planetary Collegium as their starting point, members of the round table address research issues as they relate to the development of practice and theory in the context of collaborative criticism and inquiry across a wide field of knowledge and experience. The Collegium network is worldwide, in terms of its meeting and conference locations, the cultural identity of its members, and its ambition to develop nodes based on and complementary to its unique procedures and methodologies.

The Collegium emerges from 10 years of experience with CAiiA-STAR in gathering doctoral and post-doctoral researchers of high calibre whose work transcends orthodox subject boundaries, and whose practices are at the leading edge of their fields. We are living in a time of crisis for universities, museums and corporations, a time in which old cultural and academic structures need to be replaced by research organisms fitted to our telematic, post-biological society. The Collegium combines the physical, face-to-face transdisciplinary association of individuals with the nomadic, trans-cultural requirements of a networking community. The panelists, all members of the Collegium at various stages in its development, present their personal visions of the direction future research might take and the structures needed to support it.

ROY ASCOTT (CHAIR)
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DONNA COX
University of Illinois at Urbana-Champaign

MARGARET DOLINSKY
Indiana University

DIANE GROMALA
Georgia Institute of Technology

MARCOS NOVAK
University of California, Santa Barbara

MIROSLAW ROGALA

THECLA SCHIPHORST
Simon Fraser University

DIANA SLATTERY
Rensselaer Polytechnic Institute

VICTORIA VESNA
University of California, Los Angeles

Ars Electronica: 25 Years of the Digital Avant-Garde

Celebrating 25 years of Ars Electronica. The panel provides not just interesting historical information, but also comprehensive insight into new directions of digital art.

ROY ASCOTT (CHAIR)
University of Plymouth

CHRISTINE SCHÖPF
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Ars Electronica

KAREL DUDESEK
Ravensbourne College of Design

MICHAEL NAIMARK
New York University

BARBARA ROBERTSON

Since its invention in 1979, Ars Electronica has maintained its strong focus on the crossovers between art and technology. With each annual edition of its Festival for Art, Technology and Society, Ars Electronica has become more and more an international meeting point for the ever-growing community of people interested in digital art, its practise, and its theories. The festival advanced from an insiders' event for pioneers and early adopters to the major event of the international digital art circus.

Ars Electronica also developed a strong influence on the local level and became a major driving force in Linz, Austria's process of transformation from a city based on the aging steel industry to a new economy of innovative technologies and industries, and it became an icon for Linz's new identity as a modern cultural city.

Ars Electronica established a unique dialogue between artists and scientists to explore the possibilities of digital technology and to encourage critical awareness of its cultural and social impact. Emerging technologies, new artistic practises, and advanced theories have very often found their first large public presentation at the annual Ars Electronica Festival.

In 1987, Prix Ars Electronica was introduced as the first international art competition dedicated exclusively to digital arts. It was the logical next step for Ars Electronica and an immediate success, not least because of its significant prize money and its high profile among jurors and award winners. Over the past 17 years, about 30,000 works have been submitted to this annual competition, and prizes totalling $US1.7 million have been presented to artists. The Prix contributed essentially to the building of Ars Electronica's large international reputation and its network of partners, friends, and collaborators.

With the opening of the Ars Electronica Center in 1996, Ars Electronica's field of operation was significantly redirected toward the general public and development of new forms of collaboration among art, science, and the general population. The Center resembles a prototype for a fully interactive museum and acts as a successful educational walk-in centre for a broad spectrum of audiences. It features frequently changing exhibits of outstanding media art works and innovative research projects from artists and media laboratories all over the world.

The Ars Electronica Futurelab, also founded in 1996, is an internationally acclaimed model for interdisciplinary collaboration among artists, designers, engineers, and researchers from the academic and commercial communities.

High-profile artists-in-residence projects as well as top-level research projects with large corporations provide a very inspiring and challenging foundation for any type of creative work in new technologies.

The panel provides not only interesting historical information, but also a comprehensive insight into new directions for digital art.

Synaesthesia

This panel discusses synesthesia, which typically involves sensory crossover among the basic senses (vision, hearing, taste, smell, and touch) within the normal range of sensation.

ROY ASCOTT (CHAIR)
University of Plymouth

DONNA COX
University of Illinois at Urbana-Champaign

MARGARET DOLINSKY
Indiana University

DIANE GROMALA
Georgia Institute of Technology

MARCOS NOVAK
University of California, Santa Barbara

MIROSLAW ROGALA

THECLA SCHIPHORST
Simon Fraser University

VICTORIA VESNA
University of California, Los Angeles

Synaesthesia Abstracts

DONNA COX

Baking Images with the Taste of Color

Visualization and digital-image generation requires control of red, green, and blue color specification in quantitative numbers. Cox's first love in making digital images is in the process of cooking with color, as a synaesthetic experience. As an artist, she practiced painting and color photography. In 1983, she discovered digital imaging and numerical control of perceptual color. By 1985, Cox developed an Interactive Computer-Assisted RGB Editor (ICARE) that enabled color control using trigonometric sinusoidal functions. She will discuss the link between her synaesthetic taste of color as a physical experience and the digital bake-offs in large collaborative visualization projects over the past 21 years.

Cox collaborates to make data-driven digital animations from sensored observations and simulations. She has played multiple roles in these collaborations, but most of the projects involved her control or influence on the design of color. While she has collaborated with scientists and developed new methods for color design, she primarily and intuitively experienced color by taste. Her "tasteful" embrace of color has lead to innovative color solutions for scientific visualization. She describes several projects that include the "grid" virtual technology and other advanced technologies used to create animations for museum displays, PBS Nova television shows, and other large-scale colorful projects. Cox discusses how the "taste of color" affects her palettes and how this approach reveals itself in striking contrast to many of her scientific colleagues.

Her collaborations include the 1997 Academy Award-nominated IMAX movie "Cosmic Voyage," for which she was associate producer/art director for scientific visualization. In this Round Table, she also shows astrophysical visualizations and decisions she made in producing "Unfolding Universe" for the Discovery Channel. Under her direction, the NCSA Experimental Technologies Group recently completed a tornado project for Nova, "In Search of the Super Twisters," which she will explain in her exploration of the relationship among technology, visualization, displays, and synaesthesia.

DIANE GROMALA

Riots of Sensation

A medically defined, idiopathic abberation. A keyboard that produces a different taste for each note. A cyberpunk ideal. An LSD trip. An artistic method to expand consciousness. The man who tasted shapes. Each could be an instance of synaesthesia, defined as "the transposition of sensory images or sensory attributes from one modality to another." Synaesthesia has proven to be a provocative concern of Western artists and scientists alike, arguably from the era of Isaac Newton and John Locke, prominently in the late 19th century, and certainly in contemporary times.

Although synaesthesia still is not well understood and suffers from mild associations with moderate deviance, its importance can be inferred by the prominence of the scientists, artists, and philosophers who have historically grappled with it, and by its cyclical recurrence as an object of intense scrutiny. Interest in this phenomenon curiously seems to resurface during times of technological change, such as our own. Yet the ways of defining, understanding, and contextualizing synaesthesia have traditionally divided artists and scientists. This paper argues that the shared interest in emerging forms of technology among certain artists and scientists, through a phenomenological approach, promises to be far more productive than the usual feel-good interdisciplinary enterprises suggest.

The paper briefly outlines the major assumptions upon which most contemporary and historical accounts of synaesthesia rest as seriously problematic, pointing to examples familiar to the SIGGRAPH community. For example, the notion that we have five distinct senses has given way to the identification of other senses, and a reconsideration of their distinction (the so-called "binding problem" in consciousness studies). Though this has been an outgrowth of research in much larger realms, the focus here is on the work of artists, cognitive and computer scientists, and experiences encountered in work with technology, such as proprioception in virtual reality.

The paper then posits a reconsideration of synaesthesia, by describing continually fluctuating perceptual fields, thresholds, and liminal states that arise from stimuli, both internal and external. It will focus on the potentials and possibilities that emerging technologies hold for users to "remap" sensation, drawing on the overlapping findings of scientific research and artistic practices.

MARGARET DOLINSKY

Synaesthesia in Your Toolbox

In reality, synaesthetic percepts have been found for a wide variety of intermodal combinations. Senses are not discreet and often work in unison, one triggering the other. For example, a trained pianist feels sound through her fingers. She is kinesthetically aware of finger

positions, tactilely sensitive to the keys and auditorially attentive to the sound. As she plays the piano, the tactile becomes sound as one sense predicates another.

When we are confronted by a novel sensation, we rely on our senses to correlate it to previous percepts and learn how to incorporate it within our base knowledge. The senses act as meta-knowledge that can be extended and developed. Perhaps synaesthesia has different levels of definition. Perhaps synaesthesia is not uncommon; perhaps the senses are not discreet but instead one modality often invokes another.

In virtual reality, participants see images moving past them, which triggers a sensation of motion. Participants can perceive height, move into empty space, and sense themselves falling. The visual can become kinesthetically effective enough to cause a range of physical sensations from dizziness to motion sickness.

Philosopher Andy Clark posits that humans have not entered a post-biological era but, rather, have always been natural born cyborgs using tools as extensions of the body. From the early adaptation of tools to create cave paintings to the recent ingestion of nanobots to capture corpus video, we have incorporated foreign objects with our biological mainframe to heighten our senses and awareness. A case in point: the artist uses the paintbrush as an extension of her body, feeling the sensuousness of the camel-hair tip as it caresses the canvas, leaving a moist trail of color in its wake. The flow of the hand, brush, and paint connect the action, image, and body physically, mentally, and sensorially into one place, one moment, and one being. This process, termed "flow" by psychologist Mihalyi Csikzenmihalyi, is an action that is summarized by a "total involvement with life." Psychologists believe that this process is just one of the methods that we use for gathering information, the very essence of our survival.

MIROSLAW ROGALA

I Wanted To Keep Touching the Words

Dynamic mapping involves changing (v)user behaviour and implies that a new narrative structure is needed to inform any (v)user, be it single or multiple. Dynamic mapping confronts (v)users not only with complexity, but also with the responsibilities that the freedom to navigate complex structures brings with it. In "Divided We Speak," through repeated engagement, the audience becomes comfortable with the range of freedoms they are offered. Because of the problems that have arisen in the interpretation of the movements and gestures of multiple participants in the same shared space, the spatial grammar of experience and behaviour need to be redefined. Mapping horizontal movement in the space becomes a mode of interpretation. Thus, both hand and body movements dynamically create new art forms. As participants exclaimed: "It is really amazing that you can actually touch the sound!" And another stated: "I wanted to keep touching the words." The process of dynamic mapping interactions requires exploration and decisions to be made by the (v)user. The (v)user's confrontation with power and control are determinants for expanding the aesthetic experience.

THECLA SCHIPHORST

Between Bodies, Between Senses: Practicing [Holding] the A-Wearable Self

The body synaesthetic is a simultaneous act of movement and stillness. The ability of the body to hold multiple states and multiple sensory domains is codified as daily practice in performance and somatics. Dance and theatre provide models for knowledge acquisition, information design, networked connectivity, remote sensing, and wearable technologies. In my own work with wearable technologies, the notion of LANs (local area networks) is extended to include: BANs, body area networks, SANs, skin [subtle] area networks, and MANs, meridian area networks.

VICTORIA VESNA

NanoMandala: Feeling is Believing

This paper discusses the significance of considering the ideas of a Mandala – a cosmic diagram and ritualistic symbol of the universe, used in Hinduism and Buddhism – when working with science on the molecular scale. Using an interactive installation that was created in collaboration with nano-scientist James Gimzewski and a group of Tibetan Buddhist monks from the Gaden Lhopa Khangtsen monastery in India who built a seven-foot-diameter sand mandala, I will approach this uneasy subject of the invisible made tangible by the metaphysical.

With the invention of the scanning tunneling microscope (that should really be called a tactoscope), using "touch" to feel the molecular surfaces, scientists are able for the first time ever, to access this realm in a "tangible" way and prove the complexity of "nothingness." Manipulation of individual molecules bears some resemblance to the methods monks use to laboriously create sand images particle by particle, and what is considered here in particular is the process. Eastern and Western cultures use these bottom-up building practices with very different perceptions and purposes, and the merging of the two could result in some interesting research. A Mandala can be translated from Sanskrit as "whole," "circle," or "zero." It consists of a series of concentric forms, suggestive of passages between different dimensions, the macrocosm and the microcosm, from the largest structural processes as well as the smallest. It is the planet earth, the atom that composes the material essence of our being, and the galaxy of which the earth is but an atom. By approaching the molecular worlds with this in mind, rather than the usual idea of working with nano as something very small, there is an amazing potential for discovery and expansion of our perception of our worlds.

MARCUS NOVAK

TransSense: General Synaesthesia

Synaesthesia normally occurs when input to one sensory modality registers across another sensory modality. Typically, this has involved sensory crossover among the basic senses (vision, hearing, taste, smell, and touch) within the normal range of sensation. However, several continuing developments are expanding not only the range of the senses, but also their kind, and even their scale. Numerous avenues of research, including studies of neural plasticity in the cerebral cortex, sensory substitution, prosthetics, robotics, and others, point to the expansion of the sensorium to a condition of generalized synaesthesia, in which all available sensory modalities, biological or technological, can be, to varying extents, mapped into one another.

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Andreas Berner

The Three Graces
Animation
Length 2:45

In my thesis project, "The Three Graces," I tried to bring each of the graces to life, from their individual creation as one of the elements (fire, water, wind) to their final destination as a "reunited" statue, forming the symbolic embrace of unity. Once again, they are frozen in time.

The three graces of Greek mythology represent the quintessence of art and dance for me, and artists throughout history have been inspired by them. The beauty of the human form and the body in motion are expressed best through the art of dance. I am inspired by the gracefulness of the three graces and the ancient metaphors of liberality and unity they stand for.

The original dance sequence was conceptualized and choreographed with Ayo Janeen Jackson, currently a dancer at the Bill T. Jones Dance Company. She was the representative dancer for all three graces and performed the dance movements in a motion capture session with Acclaim. The animation was further fine tuned with key frame techniques, and the final rendering of the characters was achieved through expressive particle systems in Maya.

The work is homage to and reminiscent of the early works of the "Fantasia" artists and German expressionistic animators like Oskar Fischinger.

This project was achieved within the three months of my final semester at NYU's Center for Advanced Digital Application in Spring 2003.

Tools used include: Motion Capture, 3D modeling and particle systems in Maya, 2D compositing in After Effects, Combustion, and Final Cut Pro.

Dancer/Choreographer
Ayo Janeen Jackson

Motion Capture Director
Hajime Ogata

Motion Capture Production Manager
Michael Passuello

Motion Capture Assistant
Christine Squitieri

Original Score Elements
Michael Nyman

Sound Design & Composition
Michael Oliver Drexler

Sound Engineer and Design
Christoph Goebel

Soprano
Jama Jandrokovic

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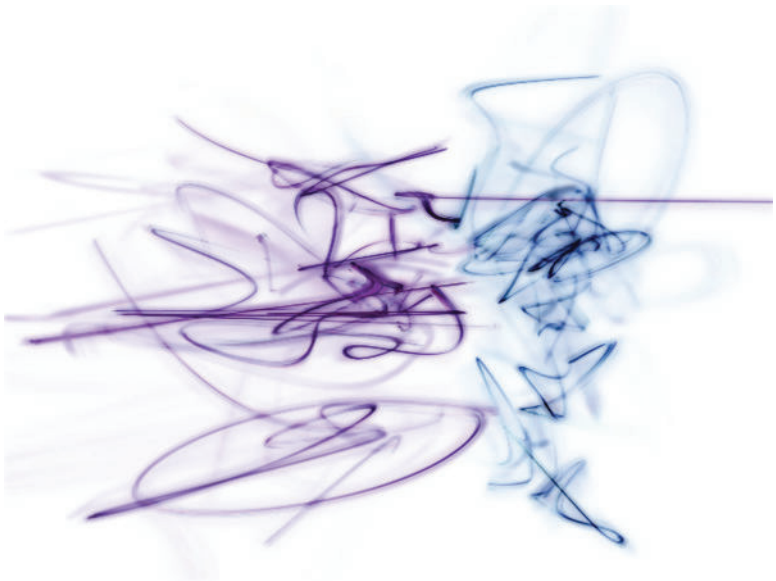

Living Canvas
Experimental Animation
Length 4:18

An abstract animation produced by a collaboration of a digital artist, choreographers, and musicians in New York and Italy. The animation is purely about motions and emotions.

To create the animation, I animated a dance performance of two CG characters in Maya based on choreography by Harumi Terayama and Idan Sharabi from the Juilliard School. The dance movements were then captured by numerous particles through simulation. These particles were used to animate some NURBS curves through MEL scripts. Finally, the NURBS curves were rendered using Maya Paint Effects.

The original music for string quartet and tabla was composed and produced by John Maida in Italy.

“Life is a canvas, and we are our own paint brush to paint who we are. Every painting is unique, and it is upon us to paint what we like on our own canvas.”

Composer
John Maida

Choreographers
Harumi Terayama
Idan Sharabi

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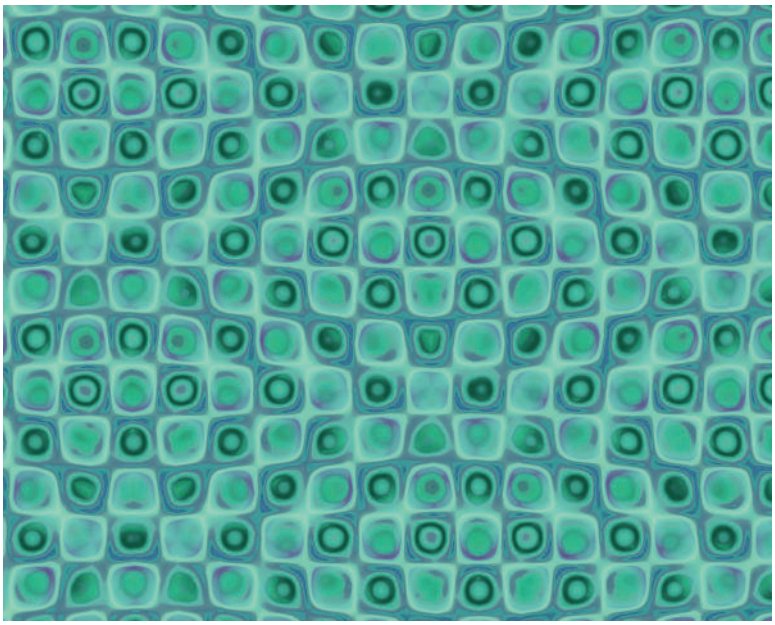

Amazilia
Experimental Animation
Length 2:15

A sonic/visual sorbet to cleanse the palette while dining on several courses of rich, over-spiced media.

A digital excursion of sound mapped to number (its raw digital state ... no pun intended), visualized (a digital paint by number) and re-sonified (a Pythagorean feast, pun intended, as it's all number anyway once you go digital). A simple process unfolds as image and sound. Hear the colors. Listen with your eyes.

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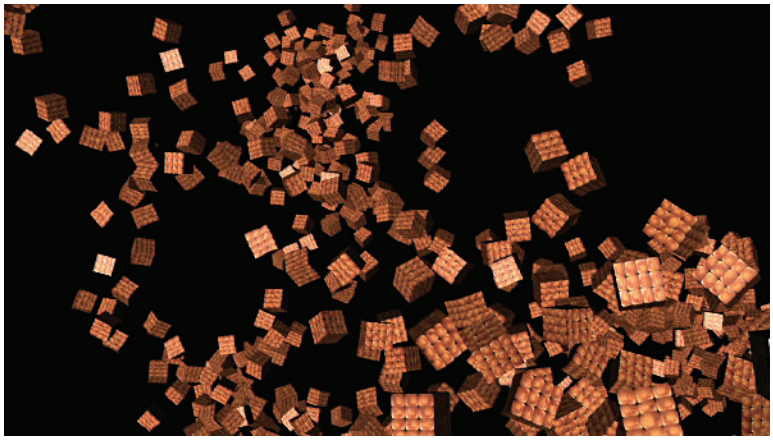

Life in the Square
Art & Design
Length 4:57

A mitose-like form is used here as a digital metaphor for the interaction between humanity and technology. With technical reproduction of human beings no longer an impossibility, questions of individuality (uniformity) will be posed in a completely new light. “Life in the Square” attempts to sketch the role of humanity in “post-human” times.

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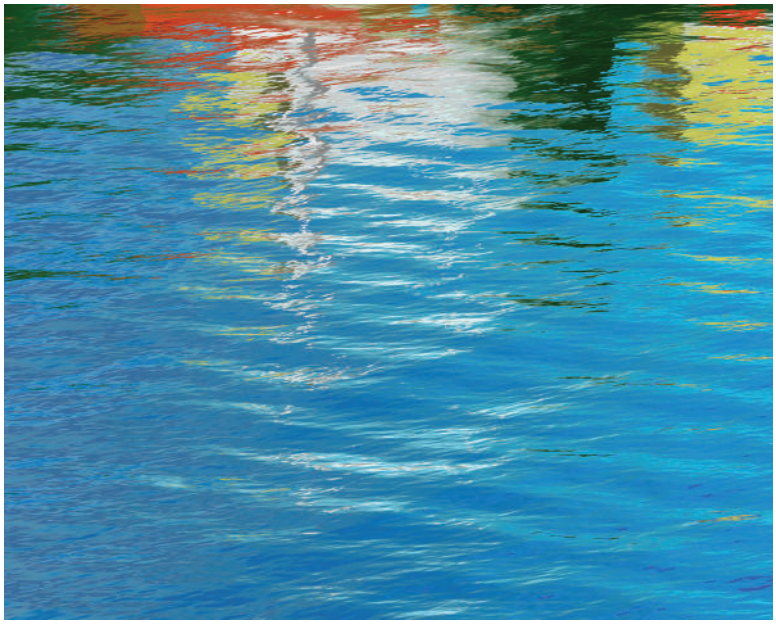

Light On Water
Art & Design
Length 3:20

In these short animated sequences, the primary intent is realising the sensations evoked by the play of light on water. The colours and shapes generated by the movement of waves and ripples, the changing surface of reflections, the light bouncing off the water's surface.

The works explore the area between realism, exploring the tools now available in a 3D computer animation system for these purposes, and abstraction, looking at the aspects of colour, form, and movement.

The primary tool used in making "Light on Water" was Softimage XSI. It was used to:

- Construct the scenes.
- Colour and texture the scenes using procedural displacement, transparency, and colour textures.
- Create material properties such as the reflectance of the water surface.
- Light the scenes, including generation of caustic light off the water surfaces.
- Composite separate layers of images together.
- Render the final images for the animation sequences.

Adobe Photoshop was used to paint houses, trees, boats, and sky images for the reflections.

The work was produced on a Dell PC. The sparkles in the "Sparkle Sea" sequence used the Glimmer Shader developed by Andy Hayes at Bournemouth University.

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Lise-Helene Larin

Collaborating by Numbers
Experimental Animation
Length 6:48

"Collaborating by Numbers 2003" is the result of my collaboration with Simon-Pierre Gourd who created two digital sound tracks for two of my films from the series of seven non-figurative 3D animations, "Painting by Numbers." He decided to call them "Music by Numbers I & II."

In my series "Painting by Numbers 2000-2004" I investigate the paint program included in Softimage 3D by painting and drawing on my objects. I model organic objects, the surface of which I animate and clothe with the same non-descript texture using various parameters in the "Matter interface" to invent a landscape. My palette consists of animating the colors of my lights. 3D animation becomes my "tool" to rearrange the elements of the traditional languages of sculpture and painting while exploring uncharted visual realms in 3D animated film. I also want to create new emotional conditions in viewing my films. I show my digiscapes in installations using anamorphosis to further heighten the sense of loss and to stimulate the imagination.

My films are about absence and void in a virtual space devoid of a point of reference but filled with textures that envelope the senses while piercing the eye. "Painting by Numbers VI" shown here, was created to be installed in a space where the viewer can be surrounded by an unusual architecture of mobile polygonal screens so that perception can be renewed and questioned while the body attempts physically to make sense of it all.

I also show still frames from my animations to arrest the movement that stirs the imagination and to allow the body to move deeper into the images that construct the film.

In "Music by Numbers II 2003," Simon-Pierre Gourd investigates immersion, space, and movement provoked by simultaneous synesthesia and perception. He creates sensations of circular heights while playing with paradoxical tonalities. The music is composed using Granular Synthesis and FOF Synthesis in CSound Language with stochastic generation in real time.

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Stephan Larson

(re)cognition
Art & Design
Length 3:50

"(re)cognition" is not a story with a beginning and end. It is an animation about the moment when something is realized, the moment of understanding, the moment of comprehension. It is the moment when something that appears random is suddenly deliberate. Cause and effect provides the stimulus for change; as one shape interacts with another, a transformation begins to occur that is perhaps more recognizable, perhaps more ambiguous. As these shapes evaporate and coalesce throughout the animation, they begin to provoke awareness – small moments when everything seen makes sense for a short time before dissolving into chaos again. It is an experience of moments, a dance of sorts.

Director
Stephan Larson

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Heebok Lee

Voice of Whale
Experimental Animation
Length 2:24

Vox Balaenae (Voice of Whale) is music by the American experimental composer George Crumb. His notation method is unconventional; it's very fluid and artistic. This piece is an abstract visualization of his music and carries his idea into animation. The music notes fly underwater and come from a giant shell with a texture of notes.

For this animation, I used After Effects and Cinema 4D for 2D compositing and 3D animation. I created basic 3D elements in C4D and imported them into AE with cameras and lighting.

PRODUCTION
Modeling: hyper-NURBS. Rendering technique used most: N.A. Average CPU time for rendering per frame: N.A. Total production time: 90 days. Production highlight: Cinema 4D integrates well with After Effects, most 3D elements were rendered in black and white to save rendering time and colored in After Effects.

SOFTWARE
Modeling: Maxon Cinema 4D 8.1 Animation: Adobe After Effects 5.5. Rendering: Dynamics: Compositing: Adobe After Effects 5.5. Additional software: Adobe Photoshop 7, Illustrator 10. OS: Mac OS 10.2.

HARDWARE
Apple Mac G4 dual 800 MHz CPU, 1.25 GB RAM.

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Producer
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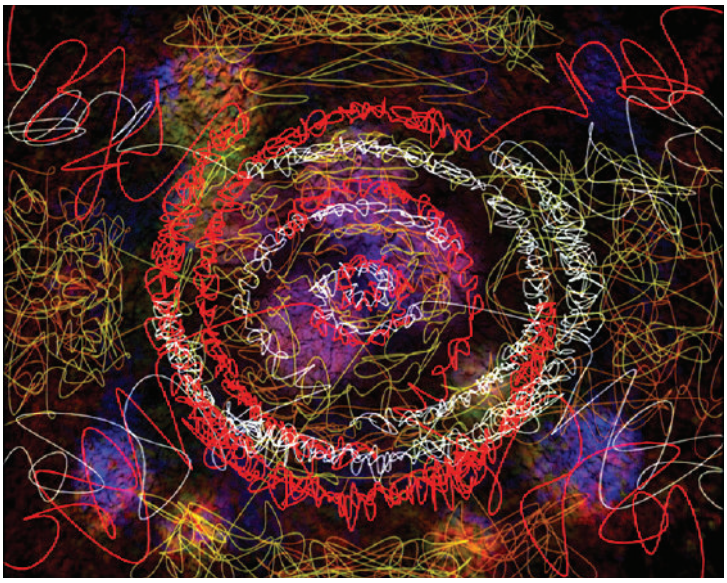

Superimposing Form Upon Chaos
Animation
Length 3:22

An animation that belongs in the abstract art category. The audio track is Prelude from Vertigo by Bernard Hermmann. The visuals are synchronized with the melody of Vertigo. Plato's ideas of using pattern to construct form in art are expressed in spirals. This animation superimposes form upon chaos in an aesthetically pleasing manner.

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Vivek Patel

Producer
Vivek Patel

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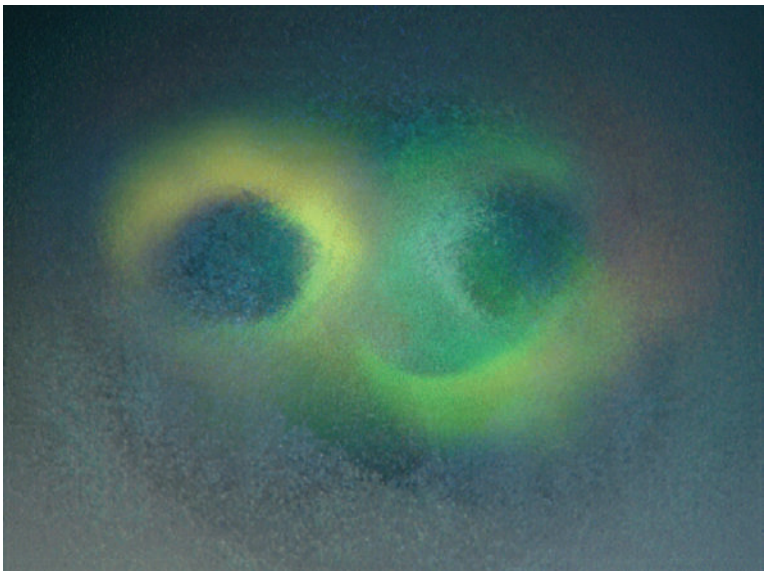

BLUE - 2004
Animation
Length 5:00

So far, music has been for the ear. This animation is music for the eye. It is a synesthetic experience, like viewing the arboreal lights.

Basically, it is an animated painting. No “story.” But something to be stared at right from the beginning and then to the very end. But an example of something, and I hope I have many colleagues still in the same domain, showing their works on the wall and on even bigger screens. In the future and for our convenience, we will be able to choose a book, a CD with music, or a DVD like this one.

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Cynthia Beth Rubin/Bob Gluck

Layered Histories: the Wandering Bible of Marseilles

"Layered Histories" is the imaginary story of an actual 13th-century illuminated Bible. This series of cascading animations mirrors the many layers of this manuscript: as a beautiful artifact, as a work of art reflecting the convergence of cultures in medieval Spain, and as a text that tells multi-layered stories.

The history of this Bible is only partially known. Created in Toledo, Spain in 1260, the Bible visually embodies the influences of Jewish convergence with Christian and Islamic cultures. When the 1492 Expulsion forced the Bible to flee Spain, it traveled to the Ottoman town of Safed, where it was amongst religious mystics seeking the means to repair the ills of the world. It subsequently disappeared until, mysteriously, sometime during the 19th century, two volumes of the Bible were discovered in the collection of the Bibliothèque Municipale of Marseilles, where they reside today.

The linear video is an outgrowth of the related interactive work, in which users control the sequencing and speed of six-second animations, as well as sound sequences. For the linear version, the authors selected the sequence of the animation segments to communicate the multiple locales that have been home for the Bible, beginning with imagery from Marseilles. The recurring images of a narrow street in Toledo anchor the timeless qualities of the Bible as a cultural artifact reflecting a certain moment in history. Decorative motifs of the Bible emerge throughout the work, and, unlike the interactive version, the animation includes a photographic image of the Bible. The rhythm of the imagery glides us seamlessly from past to present, and from identifiable locations to general reflections of landscape.

The music in the animation was crafted to evoke the sense of the Bible as a voyager, riding the waves to new homes. Human voices are manipulated so that their original language is no longer identifiable, thus reinforcing the fact that this text resided in many places, among many speakers. The unfolding, veiled referential qualities of the sounds reflect an aesthetic parallel to that of the animations, although they each emerge and change at their own independent pacing.

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Junko Hoshizawa Sedlak

Nichigraphs
Art & Design
Length 2:09

Every language has beauty in its characters. This is what you see in the design of written Japanese, in its swishes, jumps, and stops. When people see their language, they naturally read meanings and perceive images at the same time. But please enjoy the design of these Japanese characters without meanings, reading, and thinking, as if you are a foreigner who wears a t-shirt that has Chinese characters on it.

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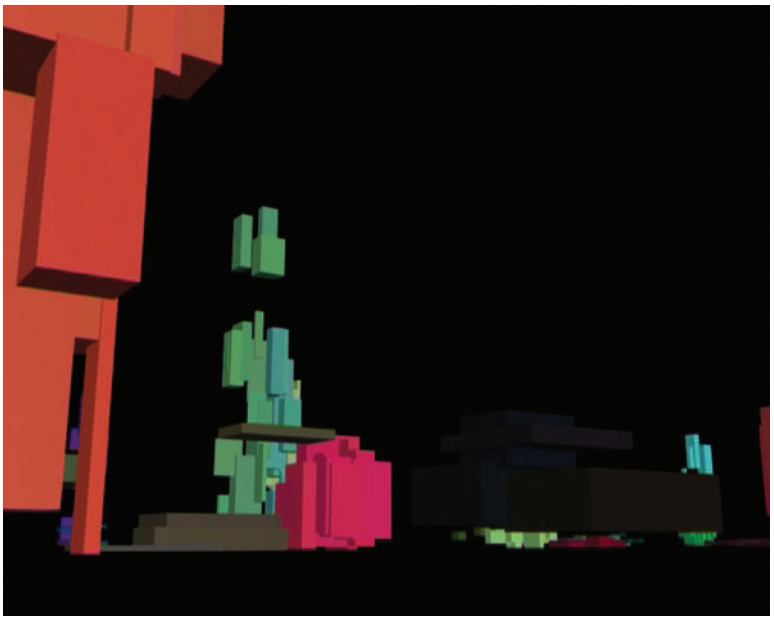

Inaudible Cities: Part One
Art
Length 6:40

The first in a series of short films by Semiconductor, where cities are made of and controlled by sound. In this episode, every detail of an urban landscape is built by the sonic pressures of an oncoming electrical storm. The very fabric of this isolated world is defined by the noises and frequencies that surround a space in another aural dimension. Semiconductor wrote a script in 3d max that listens to parts of the soundtrack and constructs the animated environments.

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Semiconductor

Producer
Semiconductor

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Joe Takayama

MICROCOSM
Art & Design
Length 2:59

Looking through a microscope, we find the micro cosmos where many curious things exist: snowflakes, pollen, germs, and so on. Microbes such as freshwater algae are very interesting. Although their geometric cell structure is very simple, they reveal a variety of artistic forms. This work is an attempt to use original software to represent a micro world. Square metaballs (meta-cubes) were used as the main algorithm for modeling the algae-like objects.

Director
Joe Takayama

Producer
Joe Takayama

Faculty Supervisor
Etsuo Genda

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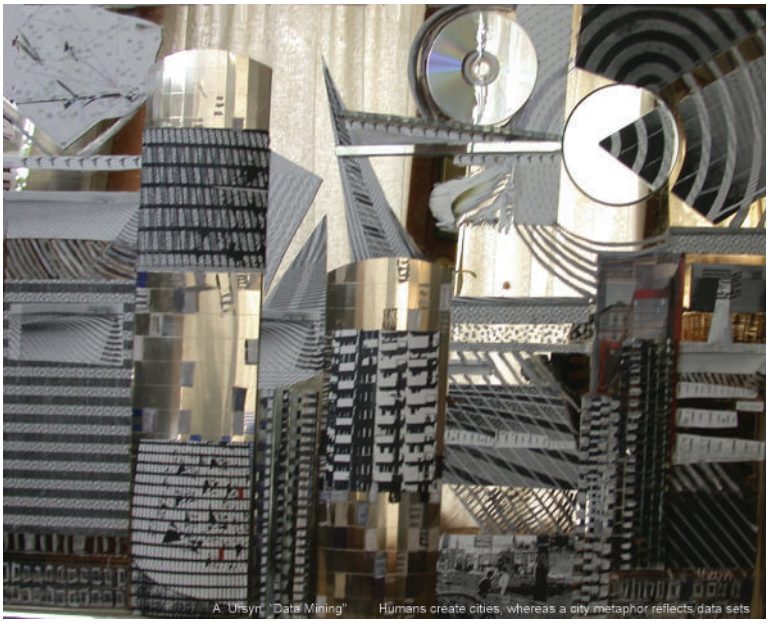
Anna Ursyn



Data Mining
Art & Design
Length 0:29

Humans create cities, whereas a city metaphor reflects datasets.

What do technological and human worlds have in common? Natural order guides our understanding of big datasets related to network analysis, when we employ physical analogies of the data, render the data graphically, explore them "by eye," and interact in real time. My task is to juxtapose the regularity of nature with human physical and intellectual constructions. The big city, for example, combines how humans affect their environment and how a city metaphor reflects rhythm and organization of big datasets, and makes data mining easier. Observers, whether artists or technology experts, perceive such relationships from different perspectives and different points of view.

Software: Adobe Photoshop, Final Cut Pro, QuickTime, programs written in Fortran.

Hardware: Macintosh, Vax, digital camera.

Techniques: Computer plots obtained using Fortran and IGL, and transformed into photo-silkscreens for color variation were applied on the surface of a mirror to create an image of a city. A short animated film with people in motion was projected on this mirror surface, creating a reflection of people's movement. Thus the image of the city was juxtaposed with the animated actions, to show how big-city life involves individual life events and daily routines.

Director
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Producer
Anna Ursyn

Contributors
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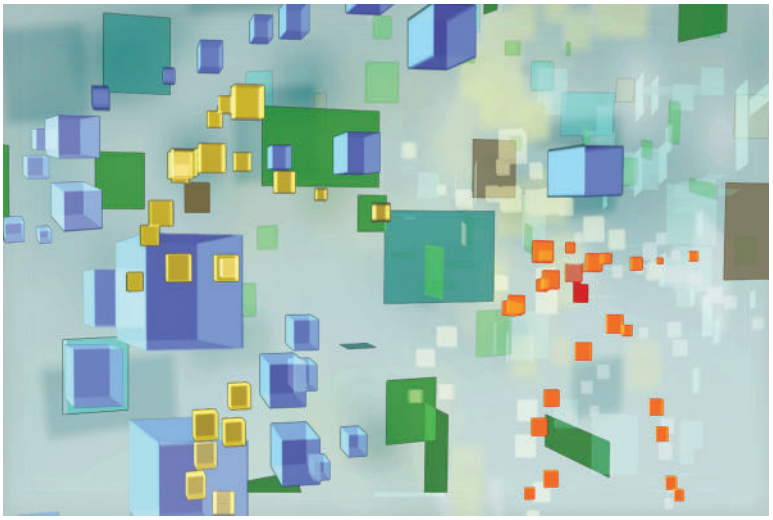
Beth Warshafsky



AnthroDance
Experimental Animation
Length 3:00

An exploration of human motion through dance and technology. A series of dances is translated (through motion-capture sensors) into data in a digital 3D environment. The data are then re-interpreted through an aesthetic process via 2D and 3D animation processing and editing. The process is a fusion of artistic and technological sensibilities.

In "AnthroDance," motion provides both an armature of expression and a source of data from which to draw new relationships in animation. The 3D environment opens choreographic possibilities among dancer, camera, space, and time.

Bringing the data into the (physical) confines of the computer expands the (ephemeral) possibilities for interpreting movement. This allows the work to develop beyond what would be possible in the physical world.

Across the forms, the dancer's original motion forcefully transcends the limitations of digital media, allowing technology to enhance, rather than override, the physical experience. The end result, translated and reinterpreted through digital media, is a sensory fusion of human motion, technology, and music.

The body and the computer are equally essential to the project – in the absence of either, it would cease to exist.

Director
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Producers
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Ellen Scott

Sound
Gerry Heminway

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Maria Wiener

Dialogos
Experimental Animation
Length 4:08

In Greek, "Dialogos" means dialogue. Drawing inspiration from the experiments currently taking place at the Massachusetts Institute of Technology in relation to technologies that can generate holographic video images, "Dialogos" is a "pilot" for future live performances. It demonstrates the kind of dialogue that could exist between performers and projections, between the real and the virtual, between performers and holograms. It represents a live performance of a duet for a live performer and his projected kinetic hologram.

In "Dialogos," the performer can pass through the projection, and the projected figure can pass through the live performer and the transparent projected surfaces and dance on stage with him. Therefore "Dialogos" manifests a marriage between dance and technology in the future, in which both figures are celebrating as if they are performing a ritual.

"Dialogos" is a collaborative project among a performer, two model designers, a composer, and a director/digital choreographer. It was formed from motion-capture data, using Vicon 8 transferred to 3d studio max.

"Dialogos" has received a Certificate of Merit at INTERCOM (The International Communications Film and Video Competition), a division of the Chicago International Film Festival, under the Category of Special Achievement for Computer Animation in 2003.

Director
Maria Wiener

Producer
University of Lethbridge

Movement Source
William Smith

Music Composition
Nikolaj Bjerre

Digital Representation
Kristy Sorgard
Ghassan Zabaneh

Digital Choreography, Camera, and Direction
Maria Wiener

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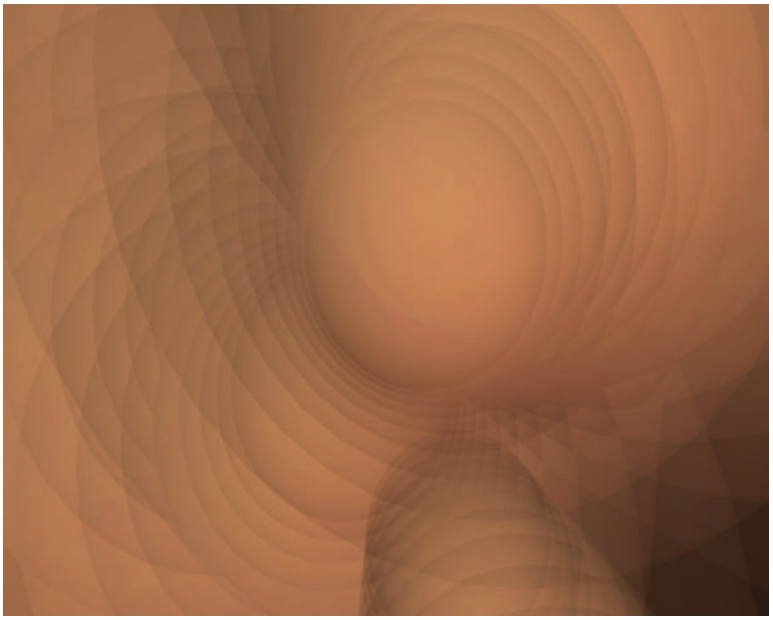
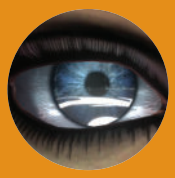


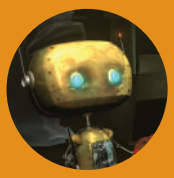
glAmor
Experimental Animation
Length 4:20

"glAmor" is a visual ode to the mysterious powers by which geometry is able to move our emotions, ranging from the purely sensual and erotic to the cerebral, the spiritual, and even the sublime. It was programmed by the author in C and OpenGL using a Macintosh G4 computer. The sound track was developed using Digital Performer and was recorded by the author using a Yamaha PSR 500 keyboard. Production and post-production were done with After Effects and Final Cut Pro.



CHAIR
Chris Bregler
New York University

Computer Animation Festival



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Introduction

The following pages present a juried selection of this year's finest, most innovative, creative, and entertaining computer animation and visual effects. The SIGGRAPH 2004 Computer Animation Festival includes great story-telling and filmmaking, and introduces new revolutionary ways of using this still-young medium in entertainment, science, and the visual arts. Once again, the Computer Animation Festival raises the bar of what is possible in a world that is only limited by peoples' imaginations. This festival began 30 years ago, when a few people showed their own films in informal screenings at SIGGRAPH 74, and has grown into arguably the most competitive festival in our field, a major production that now involves a team of 35 staff and volunteers working passionately for endless hours over the course of a full year. It is a great joy and honor to put together this program that showcases another annual milestone in the history of computer graphics animation and visual effects.

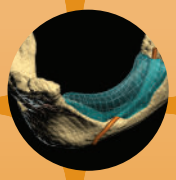
An even greater joy is to work with such a fantastic team: the SIGGRAPH 2004 Computer Animation Festival committee in New York and across the country and the world. It all started to become real when our first official submission appeared in my mailbox on 22 October 2003. Our team gathered around the screen to eagerly watch this first entry and realized: Wow, it's started. We are going to do this festival now. There is no turning back. The wave of submissions to our New York office dramatically increased in the following months, finally totaling 643 entries. During the last few days before the May 3 deadline, submissions were hand-delivered by express services from all over the world. People drove their submissions from other states and delivered them in person. It was exciting and gratifying to see their faces light up when we said: "Yes, you made the deadline." One week later, our jury arrived – a diverse and distinguished panel chosen for their broad understanding of current research, innovations, art, trends, and production values used in the creation of computer graphics animation and effects. Also, this year we are proud to have had a very international jury, from Europe, North America, and Japan: Christine Schöpf from Ars Electronica and ORF, Ines Hardtke from the National Film Board of Canada, Boo Wong from Curious Pictures, Paul Debevec from the University of Southern California (and thanks to him for taking the jury pictures in the circles above), Darin Grant from Digital Domain, Shuzo Shiota from Polygon Pictures, Sue Gollifer from the University of Brighton, and, as alternate jurors: Anezka Sebek from Parsons School of Design and Sam Black from Pixar Animation Studios. The jury watched every entry (many of them several times) and picked the winners during a dramatic four-day marathon. We worked 12-16 hours each day at New York University's Courant Institute and the new Tisch Film School screening rooms with the help of an army of student volunteers and production staff, directed by our Associate Producer Debbi Baum, whom we really have to thank for running such a daunting task flawlessly.

On the fourth day of the jury meeting, 30 pieces were selected for the Electronic Theater, another 53 for the Animation Theater, and 18 pieces for our program in the Art Gallery. Two wonderful and captivating pieces stood out immediately: “Birthday Boy” from Sejong Park and “Ryan” from Chris Landreth, who received the Best Animated Short award and Jury Honors award, respectively. Much to our surprise, this year we saw an unusually large number of fantastic international submissions, and almost half of all accepted pieces came from outside the US, mostly from the UK, France, Canada, Japan, and Germany. We also selected some very interesting work from the Czech Republic, Poland, Russia, Spain, Brazil, and Hong Kong. We were also pleased to note the rather large number of student submissions this year. We accepted 27 student entries for the Electronic Theater and Animation Theater, and another four student pieces for the Art Gallery. Also, the Best Animated Short, “Birthday Boy,” is by a Korean student from the Australian Film, Television and Radio School (AFTVRS).

Acknowledgements
This show is the product of an international community of animators, directors, filmmakers, schools, studios, and independents, who submitted their best; a very distinguished, diverse, and international jury who gave their best; and a great production team who gave more than their best. My deepest thanks and appreciation goes to our core team at NYU: Kevin Feeley, Clilly Castiglia, Debbi Baum, Jessica DeVincenzo, Sally Rosenthal, and Bo Wright; to Anezka Sebek at Parsons for curating and directing the Animation Theatre; to Boo Wong and Damon Ciarelli from Curious Pictures for creating the title sequences with the help of Anezka and her students; to Evelyn Rivera, Michel Pyles, Hesley Keenan, Anthony Mauro, and Rachel Thureen at HBO Studio Productions for endless late-night editing sessions to cut all the trailers and the final show together; to Isaac Kerlow for his new technical specs program here in the Electronic Art and Animation Catalog and on the DVD; to Ladd McPartland for the film editing; to all the volunteers in New York (T.J. Alston, Robb Bifano, Alyce Benvenides, Kate Brehm, Eugena Choe, Alyssa Lees, James Richards, Chris Ross, William Sadler, Jeremi Sudol, Lorenzo Torresani, Jay Baum, Jeff McAndrews, Jon Meyer, Marcia Saito-Eckel, Ali Khawaka, Ian Etra, Erol Gunduz, Valarie Johnson, Steven Zaharakis, Gwen Murray, Joon Myung Park, Dan Bornstein, Amy Hay, Amber Alvarez, David Haines, Bruce Dominguez, and Trilby Schreiber), who made the jury weekend one of my most memorable experiences; to Daniel Durning from New York Institute of Technology for his outreach efforts; to Peter Weishar at Savannah College of Art and Design for setting things in place initially; to Joe Munkeby for designing and making endless last-minute changes for us in the online submission system; to Leona Caffey at SmithBucklin and Jocelyn Edin and Tom Rieke at Q LTD for really doing all the work on this catalog and the web site, and on top of this dealing with us; to Cindy Stark and Sheila Hoffmeyer of SmithBucklin; to April Ramey, Jennifer Anderson, and Dino Schweitzer from Capstone for also being the strong backbone behind this adventure, and a very special thanks to Jim Irwin, Gary Clark, Ed Goodman, John Kennedy, Mark Podany, and Tom Popielski from AVW, who really put up and ran the show in LA, and Dena Slothower, our Conference Chair, who made it all happen; and last but not least to my boss, Margaret Wright, for letting me do this on her payroll, to Chuck Newman, the director of the NYU Courant Institute for further financial support, and to Mary Schmidt Campbell and Sheril Antonio at NYU’s Tisch School for supporting the jury meeting with their fantastic facility.

We also received support from many companies and organizations, financially and with staff and equipment: NYU Courant Institute, NYU Tisch School of the Arts, NYU CAT, Parsons School of Design, Curious Pictures, HBO Studio Productions, Vicon Motion Systems, Apple Computer, Inc., NVIDIA Corporation, and Cycling ‘74.

Chris Bregler
SIGGRAPH 2004 Computer Animation Festival Chair
New York University



Committee & Jury

SIGGRAPH 2004 COMPUTER ANIMATION FESTIVAL CHAIR
Chris Bregler
New York University

COMMITTEE
Kevin Feeley
Co-Producer
New York University

Clilly Castiglia
Co-Producer
New York University

Sally Rosenthal
New York University

Evelyn Rivera
Video Editor
HBO Studio Productions

Ladd McPartland
Film Editor
Industrial Light + Magic

Anezka Sebek
Animation Theater Director
Parsons School of Design,
New School University

Debbi Baum
Associate Producer
New York University

Jessica DeVincenzo
Project Manager
New York University

Isaac Kerlow
Independent Director

Daniel Durning
Outreach Director
New York Institute of Technology

Peter Weishar
Savannah College of Art and Design

JURY
Paul Debevec
USC Institute for Creative Technologies

Shuzo John Shiota
Polygon Pictures

Darin Grant
Digital Domain

Boo Wong
Curious Pictures

Christine Schöpf
ORF and Ars Electronica

Ines Hartdke
National Film Board of Canada

Sue Gollifer
Art Gallery Chair 2004
University of Brighton

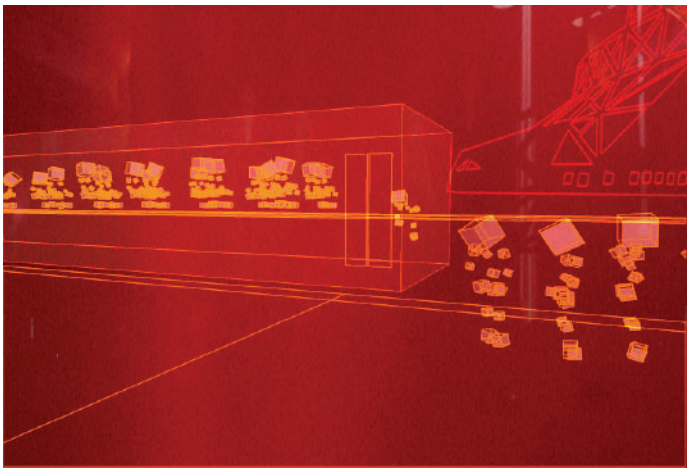
Sam Black
Alternate Juror
Pixar Animation Studios

Anezka Sebek
Alternate Juror
Parsons School of Design,
New School University

Acknowledgments

Apple Computer, Inc.
Arben Agai
TJ (Terry) Alston
Amber Alvarez
Sheril Antonio
Debbi Baum
Jay Baum
Alyce Benvenides
Robb Bifano
Sam Black
Dan Bornstein
Kate Brehm
Red Burns
Mary Schmidt Campbell
Clilly Castiglia
Damon Ciarelli
Curious Pictures
Cycling '74
Paul Debevec
Jessica Devincenzo
Bruce Dominguez
Luke Dubois
Ian Etra
Kevin Feeley
Sue Gollifer
Darin Grant
Erol Gunduz
David Haines
Ines Hartdke
Amy Hay
HBO Studio Productions
Tom Igoe
Valarie Johnson
Isaac Kerlow
Ali Khawaja
Alyssa Lees
Rosanne Limoncelli
Jeff McAndrews
Jon Meyer
Gwen Murray
Michael Naimark
Charles Newman
New York University CAT
New York University, Courant Institute
New York University, Tisch School of the Arts
NVIDIA Corporation
Joon Myung Park
Parsons School of Design New School University
James Richards
Sally Rosenthal
Chris Ross
Marcia Saito-Eckel
Katie Salem
Christine Schöpf
Trilby Schreiber
Anezka Sebek
Shuzo John Shiota
Jeremi Sudol
Maureen Sullivan
Cheryl Sylivant
Lorenzo Torresani
Vicon Motion Systems
Peter Weishar
Eleanor Williamson
Bo Wright
Margaret Wright
Boo Wong
Christina Yang
Josh Yu
Steven Zaharakis
Eric Zimmerman

Computer Animation Festival Titles



This year's Electronic Theater and Animation Theater title designs are inspired by the world that the annual SIGGRAPH conference creates for a brief period each year. The titles were designed with the idea that SIGGRAPH is a world unto itself, with inside jokes amongst those who have been attending for years and humorous revelations for first-time attendees. They commemorate and celebrate the unique people, happenings, and experiences that make the SIGGRAPH conference such a memorable event.

Contrasting life-like motion capture with minimalist design, the titles attempt to separate physical space and form from the actions and behaviors that make the SIGGRAPH community a living entity. To achieve this, two New York-based comedy groups were asked to motion capture "typical" SIGGRAPH behaviors and experiences. From many students crammed into one hotel room to someone falling asleep during a panel, the comedians helped recreate SIGGRAPH situations, while adding their own comedic touch.

Professionals at Curious Pictures in New York, students at Parsons School of Design, and a production team from New York University joined together in a collaborative effort to make the title designs a reality. This collaboration gave students an opportunity to gain professional experience and exposure to the industry, and it allowed professionals to partner with talented and excited young individuals from New York universities. The titles project brought together a range of knowledge and perspectives to create a fresh look for the SIGGRAPH 2004 Computer Animation Festival.

Directors
Damon Ciarelli
Boo Wong

Designer
Jonathan Garin

Technical Director
Damon Ciarelli

Sound Designer
Clilly Castiglia
Kevin Feeley

Motion Capture Actors
Elephant Larry
(www.elephantlarry.com)
Meat
(www.funnymeat.com)

Producers
Anezka Sebek

Additional Design and Animation
Parsons School of Design:
Hyehyun Ahn Hyen
Seung Kang
David Lam
Veronica Skogberg
Rahul Spall
Russ Wootton

Motion Capture Technical Team
New York University:
Chris Bregler
Kate Brehm
Jessica DeVincenzo
Kevin Feeley
Alyssa Lees
Lorenzo Torresani
Bo Wright

Birthday Boy

Character Animation, Length 9:30

Korea 1951. It is little Manuk's birthday, and he is playing on the streets of his village and dreaming of life at the front where his father is a soldier. He returns home to find a parcel on the doorstep and, thinking it is a birthday present, he opens it. But its contents will change his life.

Director
Sejong Park

Sound Designer
Megan Wedge

Sound Mixer
Chris McKeith

Editor
Adrian Rostirolla

Music Score
James Lee
Australian Film, Television and Radio School Production Co.

Producer
Andrew Gregory

Contact
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PRODUCTION
Modeling: Polygons. Rendering technique used most: Maya renderer. Average CPU time for rendering per frame: 20 seconds. Total production time: approximately 20 months. Production highlight: Caputuring the characteristics and warmth of human life.

SOFTWARE
Modeling and animation: Maya 4. Rendering: Maya 4.5. Compositing: FLAME 7.6. Additional software: Photoshop 6/7, After Effects 6. OS: Windows 2000.

HARDWARE
PC Xenon dual 1 GHz CPU, 1 GB RAM. Rendering farm: 22 CPUs.

Ryan

Animation. Short version; 7:41, shown in Electronic Theater. Full version; 13:50, shown in Animation Theater.

Director
Chris Landreth

Producers
Steve Hoban
Marcy Page
Mark Smith

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Produced by Copper Heart Entertainment in co-production with The National Film Board of Canada in association with Seneca College-Animation Arts Centre.

A gentleman panhandler. One of the pioneers of Canadian animation. Oscar nominee. Poor beggar. An artist unable to create. God observing the world. Fallen angel. Arrogant. Shy. Broken. Not destroyed.

"Ryan," directed by Chris Landreth, hovers between animation and documentary, and defies easy definition. It is based on the life of Ryan Larkin, a Canadian animator who, 30 years ago, at the National Film Board of Canada, produced some of the most influential animated films of his time. Today, Ryan lives on welfare and panhandles for spare change in downtown Montreal. How could such an artistic genius follow this path?

In "Ryan," we hear the voice of Ryan Larkin and people who have known him, but these voices speak through strange, twisted, broken, and disembodied 3D-generated characters, people whose appearances are bizarre, humourous, or disturbing. These appearances reflect Chris Landreth's personal world of "psychological realism." A world encapsulated in the words of Anais Nin: "We don't see things as they are. We see things as we are."

PRODUCTION
Modeling: NURBS, polygons, subdivision surfaces. Rendering technique used most: Maya renderer with some raytracing, no global illumination used. Average CPU time for rendering per frame: N.A. Total production time: two years. Production highlight: Ryan is an independent CG film, a coproduction between a Toronto-based film company (Copper Heart Entertainment) and the National Film Board of Canada. The studio space and equipment for this production were provided by Seneca College in Toronto, so that the best graduating students of its emerging animation program could work with experienced CG professionals to create a quality, hand-crafted CG film. This collaboration took place over an 18-month period. The professional staff consisted of the director, a CG supervisor, and a lighting/rendering/compositing specialist. The student staff consisted of four animators, one texture artist, and one character modeler. Over 20 other people volunteered on parts of the project, from creating smoke effects to modeling entire sets.

SOFTWARE
Modeling, animation, rendering, and dynamics: Alias Maya 4.0. Compositing: Discreet Combustion 2.1. Additional software: Syflex1.1 for cloth simulation. Custom software: Render distortions and wrap effects, written by Karan Singh and Patrick Coleman at the Dynamic Graphics Project, University of Toronto. OS: Windows XP/2000.

HARDWARE
Workstations: Dell Precision Intel P4 dual 1.7 GHz CPUs, 1 GB RAM. Nine of these in our studio. Rendering farm: 20 CPUs (P4 2.4 GHz, 512 MB RAM) loaned by Intel. Graphics card: NVidia Quadro 2Pro Graphics.

Electronic Theater

Annie & Boo

Character Animation. Short version; 2:00, shown in Electronic Theater.
Full version; 14:30, shown in Animation Theater.

Director
Johannes Weiland

Producer
Michael Schaefer

Music
Andi Groll

Writer
Dirk Stoppe

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For the first time in her life, a teenage girl named Annie meets a real coincidence. His name is Boo, and Boo has never met a girl before.

PRODUCTION
Modeling: Subdivision surfaces and NURBS. Rendering technique used most: Maya software renderer. Average CPU time for rendering per frame: approximately 3-6 minutes. Total production time: 2.5 years.

SOFTWARE
Modeling: Maya 4.0. Animation, rendering, and dynamics: Maya 4.5. Compositing: Digital Fusion 4.0. Additional software: Photoshop 7.0. Custom software: “rain setup,” MEL script for specialized rain, written by Matthias Zeller. OS: Windows NT/ XP.

HARDWARE
PC/Intel single 2 GHz CPU, 1 GB RAM. Rendering farm: approximately 15 dual CPUs. Hardware rendering was used for final renders of some effects. Graphics card: G-force 4.

Astronauts

Broadcast & Commercials, Length 0:30

PRODUCTION
Modeling: Polygon cage with smoothed visualization/rendering (Polysmooth). Rendering technique used most: Maya renderer, some Mental Ray. Average CPU time for rendering per frame: 10 minutes.-two hours, depending on scene. Total production time: 30 days. Production highlight: First time we used Mental Ray for Maya in production.

SOFTWARE
Modeling, animation, and dynamics: Maya 4.5. Rendering: Maya 4.5, Mental Ray. Compositing: Discreet Inferno. Additional software: Adobe Photoshop 6.0. OS: Windows XP.

HARDWARE
PC/Intel Xeon dual 1.7/2.7 GHz CPUs, 1 GB RAM. Rendering farm: eight CPUs, three used in the project.

Director: Effects
Alceu Baptistão

Animation
Ricardo Biriba
Rodrigo Guimarães
Alceu Baptisão

Texturing
Rodrigo Guimarães
Magdiel Castro
Alceu Baptisão

Modeling
Marcos Smirkoff
Rodrigo Guimarães
Magdiel Castro

Matte Painting
Domingos Aquino

Producer
Vetor Zero

Concept Art
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Domingos Aquino

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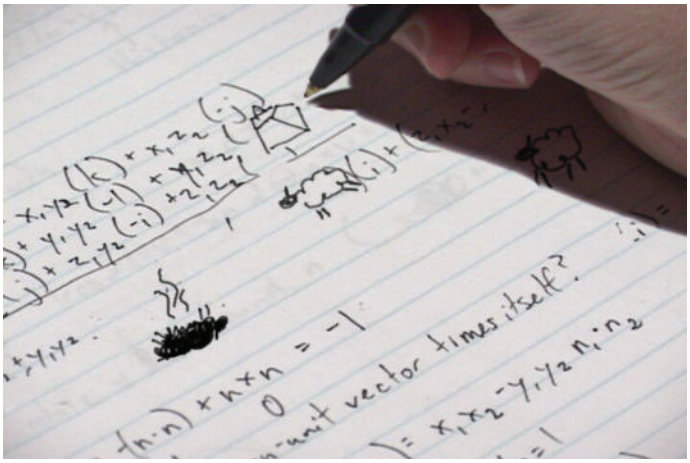
Attack of the Note Sheep

Animation, Length 1:20



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Producer
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The life of a student can be fraught with peril; she must contend with boring lectures, difficult homework, late nights at the lab, and, above all, the evil Note Sheep.

PRODUCTION
Hand-drawn animation. Total production time: approximately six weeks.

SOFTWARE
Compositing: Adobe After Effects 5.5 Pro Bundle. Additional software: Adobe Photoshop 7, DPS Velocity. OS: Windows 2000.

HARDWARE
PC/Intel P3 single 550 MHz CPU, 256 MB RAM.

Bad Boys II

Feature Film, Length 3:39

This compilation demonstrates a number of visual effects and CG animation processes:

1. The bullet sequence used a high-speed camera (4000 FPS).
2. The continuous helicopter/rave shot seams together various plates, miniatures, and CG objects, including a CG helicopter, CG rooftop, and CG pills/tray/spoon/jar.
3. The Causeway chase sequence begins with the proof-of-concept car, showing the photo-real animation and rendering of a CG Ferrari next to an actual Ferrari. In addition, the sequence includes a CG police car, truck, BMW, ND car, and boat.
4. The 360-degree Haitian shootout scenes allow the mind to envision what the camera cannot physically accomplish: passing through holes in the broken glass of a door, and through a chair, bed, and fan.
5. The 3D matte painting showcases an extraordinary transformation. Taking a helicopter shot of a mansion photographed in Miami, removing the original background and replacing it with surrounding buildings, landscape, cars, and people sets the mansion in Cuba.

PRODUCTION
Modeling: Lydar scans and subdivision surfaces. Some 2D rotoscoping used. Rendering technique used most: Raytraced with RenderMan. Average CPU time for rendering per frame: 4 layers approximately 2.5 hours. Total production time: 205 days.

SOFTWARE
Modeling and animation: Maya 4. Rendering: PRMan 10. Dynamics: Houdini 6. Compositing: Bonsai, Flame 8.3 beta. Additional software: Tracking Yannix Technologies. Custom software: Bonsai, Lighting Birps. OS: Irix 6.5, Linix Renderfarm.

HARDWARE
SGI 250 MHz single/dual CPU, 2 GB RAM. Rendering farm: 100 CPUs.

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Lead Film Recording Technician
Derrick Quarles

Lead Film Scanning Technician
Chris Arreola

Film Scanning Technician
Andrew Foote

Film Recording Technicians
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Attila Veress

Digital Color Timer
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Visual Effects Executive Producer
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Computer Graphics Supervisor
Layne Friedman

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Systems Engineering Manager
Alberto Velez

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Systems Adminstrator
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Senior Hardware/Video Engineer
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Amit Agrawal

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Animator
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BBC2 'Big Read' Bookworms

Broadcast & Commercials, Length 2:30

Using the voices of British celebrities, animated bookworms talk about their favourite books. These animations were shown as part of a long-running series designed to find the nation's favourite book.

The characters were animated in Maya and composited into live-action plates using After Effects.

Director
Stefan Marjoram

Producer
Keri Maundrell

Models
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Animation
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Alan Short
Mark Williams
Michiel DeKracker

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PRODUCTION
Modeling: Polygons. Rendering technique used most: Standard Maya renderer. Average CPU time for rendering per frame: 45 seconds. Total production time: 90 days for over 25 sequences.

SOFTWARE
Modeling, animation, and rendering: Maya Unlimited 4.5. Compositing: Adobe After Effects. OS: Windows 2000

HARDWARE
Intel PC single 2.2 GHz CPU, 1 GB RAM.

Bob and Sam: Episode 1

Animation, Length 1:16

This animated short opens on a lone sperm cell traversing the rugged terrain of the female reproductive tract. Using simulated electron-microscopic imaging, it displays a unique view of the dynamic adventure of a determined sperm cell as he searches for his soul mate, the egg. The short concludes with Bob and Sam, who provide their unique and honest insights as they critique the film. This short was created with Maya and composited in After Effects using five Windows NT workstations.

PRODUCTION
Modeling: Mostly polygons, some NURBS. Rendering technique used most: Maya renderer. Much of the electron microscope look was achieved in post within After Effects. Average CPU time for rendering per frame: approximately 10 minutes. Total production time: approximately 40 days.

SOFTWARE
Modeling, animation, rendering, and dynamics: Maya 5.0. Compositing: Adobe After Effects 6.0. Additional software: Photoshop 6.0. OS: Windows 2000.

HARDWARE
Three dual 633-933 MHz CPUs for modeling and animation, three additional Renderboxx dual 933 MHz CPUs for rendering, 1 GB RAM.

Director
Jason Guerrero

Executive Producers
Jane Hurd
Stephen Biale

Medical Art Director
Donna DeSmet

3D Animation & Lighting
Jason Guerrero

Lighting
Andy Wagener

Texture Mapping
Donald "Primo" Tolentino

Character Animation
Dean Lennert

Modeling & Rigging
Michael Ware

Character Design
Robert Castillo

Producer
Katherine Cohn
Amalia Delicari

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Carl Jaynes

Voice/Sam
Marc Petrocino

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Jason Guerrero

Composer & Conductor
Pericles Karnaris

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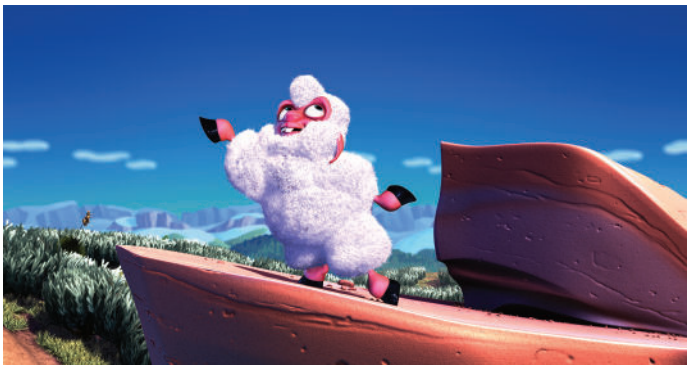
Boundin'

Animation, Length 4:39



On a high mountain plain lives a lamb with wool of such remarkable sheen that he breaks into high-steppin' dance. But there comes a day when he loses his lustrous coat and, along with it, his pride. It takes a wise jackalope – a horn-adorned rabbit – to teach the moping lamb that, woolly or not, it's what's inside that will help him rebound from life's troubles.

Director
Bud Luckey

Co-Director
Roger Gould

Supervising Technical Director
Bill Polson

Supervising Animator
Doug Sweetland

Set and Lighting Supervisor
Jesse Hollander

Producer
Osnat Shurer

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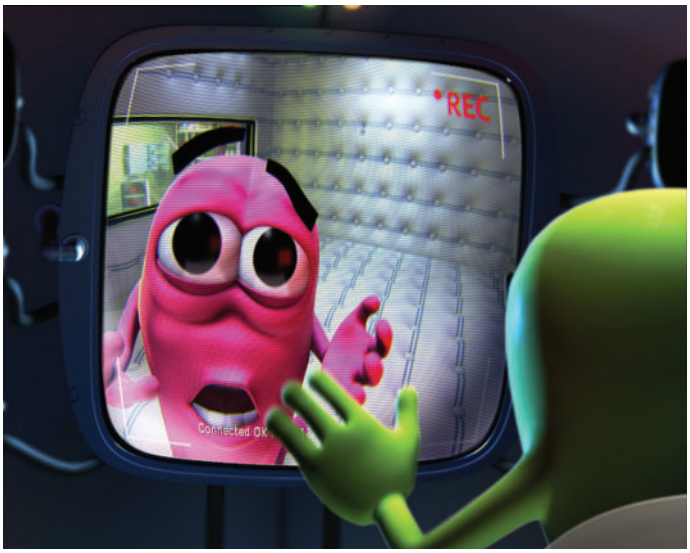
PRODUCTION
Modeling: Subdivision surfaces (Maya) with point-weighted deformations (Geppetto, proprietary software). Rendering technique used most: PRman. Average CPU time for rendering per frame: N.A. Total production time: N.A.

SOFTWARE
Modeling: Maya, Geppetto. Rigging: Geppetto. Animation and lighting: Marionette. Shading and rendering: PRman. Compositing: Shake. Custom software: Geppetto, Marionette. OS: Linux.

HARDWARE
For desktop, Intel Xeon 2 Ghz CPU, 2 GB RAM, nVidia gfx. For rendering, Intel Xeon 2.8 GHz CPU, 4 GB RAM, no gfx.

Cortex Academy

Animation, Length 2:21



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Cédric Jeanne

3D Artist Directors
Frédéric Mayer
Cédric Jeanne

Technical Director
Lolet ONG

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Cedric Jeanne
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Lolet ONG

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Aymeric Rochas

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"I cheated on you." Confronted with this declaration, the different parts of the brain react to resolve the crisis.

PRODUCTION
Modeling: Polygons. Rendering technique used most: Standard Maya renderer, Depthmap Shadow, raytraced refections. Average CPU time for rendering per frame: approximately five minutes. Total production time: approximately 130 days.

SOFTWARE
Modeling, animation, rendering, and dynamics: Maya 4.5. Compositing: Inferno 5.0. Additional software: Avid. OS: Windows 2000 Pro, Unix, Mac OS.

HARDWARE
3D CGI work on AMD 1.2 Ghz, and dual P3 800 MHz CPU. Video editing on Apple G3. Compositing on SGI Onyx. Rendering farm: 12 CPUs.

The Day After Tomorrow

Feature Film, Length 2:30

Director
Roland Emmerich

Producer
Mark Gordon

Visual Effects Supervisor
Karen Goulekas

Digital Effects Supervisor
Bryan Grill

Visual Effects Supervisor
Matthew Butler

Computer Graphics Supervisors
Sean Andrew Faden
David Prescott
Andy McGrath Waisler

Visual Effects Producers
Todd Isroelit
Julian Levi

Compositing Supervisor
Eric Bruneau

To create the destruction of Los Angeles by powerful twisters, Digital Domain created a system where twisters could be pieced together by toggling and modifying a selection of tornado components. This twister toolkit could mix and match between groupings of volumetric pieces that were then employed to make each twister unique. To destroy the City of New York with the biggest storm surge to ever hit land, we created an almost entirely synthetic city including CG buildings, cars, crowds, and, of course, the CG storm surge that floods the city, picking up buses and interacting with structures and people.

PRODUCTION
Modeling: Primarily polygonal surfaces and subdivision cages. Motion capture: Worked with Gentle Giant Studio and edited motion in Motion Builder and Maya. Motion capture blended with keyframe animation. 2D and 3D rotoscoping used. Rendering technique used most: Delayed Read Archive to render the amount of geometry needed for New York City, in-house volumetric renderer VoxelB. Average rendering CPU time per frame: varied considerably, some simulation at over 120 hours, due to fluid simulation, water render, and computer-generated people, cars, and buildings. Total production time: 20 months. Production highlight: We pushed the limits as to how much geometry we could deal with in one given scene for the rendering of New York City. A completely new computational fluid simulation tool was written for the water, and our in-house volumetric tool, VoxelB, was heavily modified to deal with both the white water and the tornados.

SOFTWARE
Modeling: Houdini 5.5, Maya 5. Animation: Maya for character animation, Houdini for FX animation, Motion Builder for editing motion capture. Rendering: Houdini Mantra 5.5, RenderMan 10. Dynamics: In-house particle tools working within Houdini, in-house Fluid Simulation tool using Houdini as a front end. Compositing: In-house software Nuke 4. Additional software: In-house software TRACK. Custom software: VoxelB volumetric rendering, Nuke, fluid simulation tools, TRACK tracking, Maya-to-Houdini and Houdini-to-Maya custom scene translations. OS: Red Hat Linux 7.2, Windows 2000 SP 2, Irix 6.5 (for Discreet products).

HARDWARE
PC Intel dual P4 2.4 GHz CPU, 2 GB RAM.

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Joe Jackman

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Hammer Chu Wai Ho
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Carlos D. Lemus
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Gaku Tada
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Rahul Deshprabhu
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Michael Harbour
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Dag Ivarsoy
Paul Lambert
David Lockwood
Michael Maloney
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Alan Precourt
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Digital Texture Painters
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Color Grader
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Bernardo Jauregui

Senior Digital Effects CG Coordinator
Tom Clary

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Christine Globke

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Tom Core

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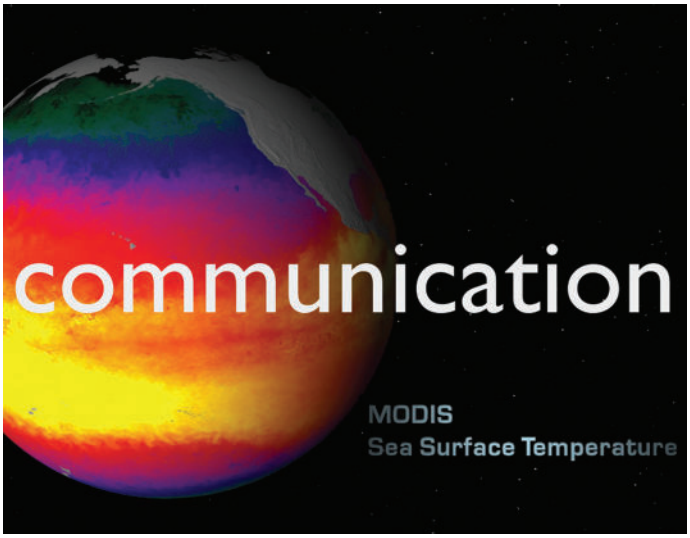
The Edge of History

Scientific Visualization, Length 2:00



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Michael Starobin

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The disciplines of earth science are just now crossing the threshold of a new era. In almost all aspects of research about our home planet, space-based data collection is beginning to play a principal role, a role that was impossible prior to the still-dawning information revolution.

Scientific visualization reveals in data what would otherwise be invisible. But unlike tangible or directly observable data collected by researchers in situ, remotely collected data present conceptual challenges to non-experts. To the casual viewer, the relevance of uncontextualized scientific visualization can seem arcane at best, irrelevant at worst. In an effort to broaden mainstream understanding and enthusiasm for this kind of work, NASA commissioned this video. Here we visualize the Earth using real data from an orbiting fleet of powerful instruments. Each of the visualizations is based on actual scientific research; nothing here is mere “window dressing.”

Source media for this video were originally delivered in high definition. Visualizers ingested satellite data into Maya or Lightwave; they used RenderMan and other tools in a UNIX render farm. Satellite and rocket models were designed in both Lightwave and Maya. Post-production used After Effects and Final Cut Pro to composite and edit the piece.

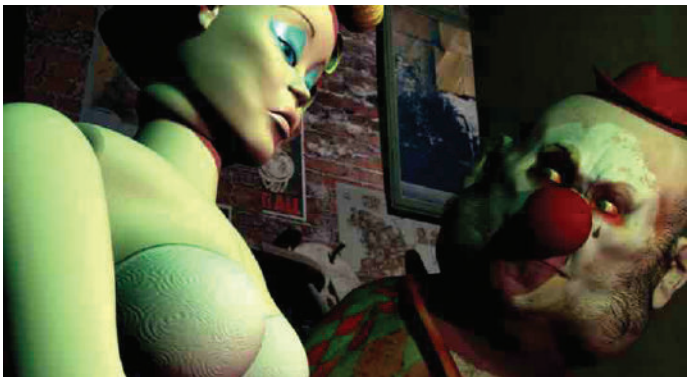
PRODUCTION
Modeling: Satellite sensors captured multiple wavelengths of reflected and emitted light. NASA science teams converted the raw signals into data, and visualizers then turned data into pictures. Scenes using GOES cloud data utilized an automated rotoscoping technique, with infrared and visible light data rotoscoped in a custom-designed process to synchronize the two channels. Rendering technique used most: RenderMan, Lightwave, and Mental Ray on Linux and SGI systems. Average CPU time for rendering per frame: 10 seconds to three days, depending on data complexity and treatment. Total production time: approximately two weeks, following months of principal R&D. Production highlight: These visualizations began their creative development as individual elements that could be understood by national news audiences in 20 seconds or less. One or two visualizers worked in partnership with scientists and a television producer to create these images, often with heavy constraints on R&D resources. Though challenging, these limitations regularly propelled the development of innovative technical and aesthetic treatments. The final sequence in this production begins with the visualization of a launch from Cape Canaveral, Florida, using actual satellite data of the Earth, and then proceeds to recreate two famous photos taken respectively from the Apollo 8 and 17 missions to the moon.

SOFTWARE
Modeling and animation: Lightwave 5.6 and Maya 4/5. Rendering: RenderMan 10/11, Lightwave 5.6 Dynamics: Satellite Tool Kit. Compositing: Final Cut Pro, After Effects. Additional software: RSI Interactive Data Language, Erdas Imagine, Photoshop. Custom software: Stand-alone applications or embedded software to translate original scientific data into textures and models. One example includes custom IDL code for taking satellite data and converting them into formats suitable for modeling. OS: Apple OS X, IRIX, RedHat Linux.

HARDWARE
Apple, SGI, IBM workstations (single, dual and multiple) 250 Mhz to 2.8 Ghz CPU, 1 GB to 16 GB RAM. Rendering farm: Up to 50 CPUs.

El Desván

Character Animation. Shorter version; 2:05, shown in Electronic Theater.
Full version: 19:20, shown in Animation Theater.



Director
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Producer
José Corral

Script and Editing
José Corral

Sound Mixing
Fernando Pacostales

Contact
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"El Desván" won first prize for animations produced in Spain at ArtFutura 2003 and won the Best Animated Award of the Spanish Academy of Cinematography.

The 27-year old director says: "I made the film because my girlfriend left me; there're no other reason. It's my first film, and I really enjoyed a lot making it. I'm already working on another one."

PRODUCTION
Modeling: NURBS. Rendering technique used most: Maya renderer. Average CPU time for rendering per frame: four minutes. Total production time: 730 days (500 for 3D animation, the rest for scriptwriting, sound, and post-production).

SOFTWARE
Modeling, animation, rendering, and dynamics: Maya 4.0. Compositing: After Effects 4.1, Jaleo. OS: Windows NT. Production highlight:

HARDWARE
Modeling, texturing, and some animation on a PC single 300 MHz CPU Some animation and rendering on a PC single 2 GHz CPU; both 512 MB RAM. Graphics card: S3 VIRGE 2 MB, and GForce2 64 MB.

Frank

Animation. Short version; 1:45, shown in Electronic Theater.
Full version; 5:40, shown in Animation Theater.

Director
Taruto Fuyama

Story & Character Design
Jim Woodring

Sound Designer
Keiichi Kitahara

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This work is an animation of a part of Jim Woodring's comic series "Frank," known as "Pushpow." It is a joint project with the publisher that first produced the Japanese version of "Frank." I created it as part of a bigger project that seeks to produce an animation of "Frank" using the techniques and interpretations of several of my animator colleagues who are "Frank" fans. This work is the first phase of the project. Subsequently, a number of works have been created using a diverse range of methods such as clay and collages, and all of them have been very well received by Jim Woodring. This version explores how to best express the movements of the characters using computer graphics without deviating from the image style and world view of the original work.

PRODUCTION
Modeling: Softimage XSI. Rendering technique used most: Characters rendered with Mental Ray, especially Toon Shader. Most backgrounds are hand-drawn and mapped onto 3D objects. Average CPU time for rendering per frame: one-five minutes. Total production time: three months. Production highlight: All production by a single person.

SOFTWARE
Modeling and animation: Softimage XSI 3.5, AURA 2. Rendering: Mental Ray. Compositing: AURA 2. Additional software: Premiere 6.5 Pro Tools. OS: Windows 2000.

HARDWARE
PC/Intel P4 single 2 GHz CPU, 1 GB RAM.

Go To Sleep

Animation, Length 3:30

"Go to Sleep" is a fully animated music video for Radiohead. The video features a low-poly version of lead singer Thom Yorke sitting on a park bench delivering the vocal of the track. He is surrounded by drone-like people walking around a city oblivous to the fact that its classical architecture is crumbling to the ground and then re-building inself in to a monolithic flat-faced future. To complete the challenging promo, Softimage XSI was used for all the modelling, shading, lighting, and rendering. Maya was used for the dynamics of crumbling buildings, and Massive was used for the street crowds. For Yorke's performance, facial capture emphasised the realism of the character despite the faceted look. An in-house script was created over several weeks for the de-res effect on Yorke's face. Our focus was to bring out Yorke's personality from his grey environment, and his meticulously tweaked motion-capture performance truly shines.

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Contributors
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Jordi Bares
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Gratuitous Goop

Technical Programs, Length 0:48

Director
James F. O'Brien

Producer
James F, O'Brien

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This video demonstrates a technique for animating the behavior of viscoelastic fluids, such as mucus, liquid soap, toothpaste, clay, or strange green goop, that exhibit a combination of both fluid and solid characteristics. The technique builds on prior Eulerian methods for animating incompressible fluids with free surfaces by including additional elastic terms in the basic Navier-Stokes equations. The elastic terms are computed by integrating and advecting strain rate throughout the fluid. Transition from elastic resistance to viscous flow is controlled by von Mises' yield condition, and subsequent behavior is then governed by a quasi-linear plasticity model.

PRODUCTION
Modeling: Implicit surfaces defined with the particle levelset method. Rendering technique used most: Ray-marching using the open-source renderer, Pixie. Average CPU time for rendering per frame: 15-30 minutes. Total production time: approximately two months. Production highlight: This piece showcases a new simulation method for modeling visco-elastic fluids (a.k.a. goop). The method is described in a SIGGRAPH 2004 paper: A Method for Animating Viscoelastic Fluids by Goktekin, Bargteil, and O'Brien. Production work was done by two students.

SOFTWARE
Modeling, animation, and dynamics: proprietary. Rendering: Pixie 1.3.4 (sourceforge.net/projects/pixie/). Additional software: Adobe Premiere 6.5. Custom software: We implemented our own code for simulation and modeling the goop. OS: Windows XP, Mandrake, and Redhat Linux.

HARDWARE
Simulation and modeling on P4 2.8 GHz CPU, 4 GB RAM. Rendering on 600 MHz Itanium cluster, 2 GB RAM per node. Rendering farm: 306 CPUs.

Innocence: Ghost in the Shell (Festival)

Animation, Length 2:52

Director
Mamoru Oshii

Animation Director
Atsushi Takeuchi

Line Producers
Ryuji Mitsumoto
Masatoshi Hishizawa

Associate Producer
Katsuji Morishita
Maki Terashima-Furuta

Producers
Mitsuhisa Ishikawa
Toshio Suzuki

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The story takes place in 2032, when human brains have been synthetically interwoven into a universal matrix, and digital communication has been so enhanced as to nearly replace independent thought. The world seems a place less for human beings and more for cyborgs (mechanized humans) and robots (dolls). Souls have become indefinitely vague and dilute.

Batou is a detective in Section 9 of the Public Safety Bureau. In most ways, he is a living doll. Almost everything about him, including his limbs, is artificial. Only a separate part of his consciousness, including the memory of a woman, Motoko Kusanagi, remains human. When female robots go berserk and begin to murder their owners, Section 9 is called to investigate. Why would a robot made for human use murder the human she is supposed to serve? Batou and his partner, Togusa, start their investigation through the cyber-network to find out what exactly has gone so terribly wrong between the humans and their dolls.

PRODUCTION
Modeling: Ordinary manual modeling. Rendering technique used most: Lightwave and 3ds max renderers. Average CPU time for rendering per frame: approximately two minutes. Spent almost a month rendering 7,200 frames, but the actual CPU time was about 10 days. Production highlight: Used projection mapping for textures on complex layers. Created several color-emphasized elements and composited onto the rendered images in order to maintain the image quality and save rendering time.

SOFTWARE
Modeling, animation, rendering: Lightwave7.5, 3ds max R4. Dynamics: Lightwave's FX motiondrive plug-in for clothing simulation. Compositing: After Effects Pro 5.5. Additional software: Animo 4.1, Photoshop 6/7, other plug-ins for effects. OS: Windows 2000, Mac OS 9.2/10.2.

HARDWARE. PC/Intel and Apple 500 Mhz-1 GHz CPU, 512 MB-2 GB RAM. Rendering farm: 17 CPUs.

The Lord of the Rings: "The Return of the King"

Feature Film, Length 5:58

For "The Return of the King," the third film in New Line Cinema's The Lord of the Rings trilogy, Weta Digital aimed to exceed expectations set by the previous two films. Returning favourites such as Gollum were taken to new heights of realism and digital performance while the battle of Pelennor Fields drew on every aspect of the VFX palette.

At Weta Digital, the work of the artist is paramount. While we have an impressive array of technology at our disposal, including world-leading and Academy Award-winning solutions for digital creature rendering and crowd animation, this technology exists only to serve as a tool set for our artists. It is the work of our artists in visualising a whole world such as Middle Earth, placing the audience in the middle of the battle of Pelennor Fields, and bringing a complex digital character like Gollum to life that we consider to be Weta Digital's true strengths.

SOFTWARE
Modelling and Animation: Maya 4.5. Compositing: Shake 2.5/3.0. Rendering: RenderMan 11.5, Grunt (Guaranteed Renderer of Unlimited Things), in-house software for rendering massive dynamics: Realflow 2.0, Syflex 2.0. Additional software: Commotion 2.2 (2D rotoscoping), Inferno, Flame, Cineon, Zbrush, Furnace, Mayaman, boujou, Reflex, 3DE, Motionbuilder, Photoshop, Advantage, Houdini, Studio Paint. OS: Linux RH7.2, Irix 6.5, Windows 2000, Mac OS X.

HARDWARE
Desktop: Dual 2.8 Ghz CPU, 4Gb RAM, NVIDIA FX1000 Graphics. Renderwall: 900 x 2.2 Ghz CPU 2Gb RAM, 2352 x 2.8 Ghz CPU 3Gb RAM.

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Producers
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Peter Jackson
Fran Walsh

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Eileen Moran

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Making of The Superpunch

Feature Film, Length 3:10

The Superpunch shows Neo's super-powerful last punch landing on Smith's face and deforming it in a surreal, anime-like fashion. In the spring of 2003, when we had gained confidence that our three-year-long R&D effort in realistic human face rendering technology could pull off a full-frame, slow-motion close-up of a familiar actor, we decided to create the shot entirely in the CG world.

With our powerful image-based facial animation technique (Universal Capture) we couldn't directly capture the extreme facial deformation depicted in the storyboards, but we processed a performance from Hugo Weaving and then had an artist layer additional facial deformations.

We deployed various techniques to construct the water elements that needed to interact with the virtual actors. For the water on and around Neo's fist and Smith's face, we used particle simulations and a custom implicit blobby surface software to construct meshes.

Even though the shot's animation was not based on physics, the appearance had to be. The shot didn't have to feel real, but it had to look real! All elements were rendered together in mental ray with full ray-tracing including an efficient and realistic subsurface-scattering approximation for skin and proper 3D depth of field.

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Kody Sabourin

Wet Appearance and Water Look Development
Masuo Suzuki

Water Effects Animation
Oystein Larsen

Rendering Lead
Tadao Mihashi

Universal Capture Performance Processing
Ken Faiman

Water Effects Software
Scot Schinderman

3-D Depth of Field Shader
Oliver James

Texture Paint
Rene Garcia

Producer
Joel Silver

Wet Hair Software
Christina Tempelaar-Lietz

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PRODUCTION
Modeling: Subdivision surfaces and polygons. Universal Capture (see SIGGRAPH 2003 sketch) was used to capture facial expressions. Universal Capture facial performance was augmented with additional deformations by an animator. Rendering technique used most: Raytracing in mental ray. Average CPU time for rendering per frame: 20 hours. Total production time: 120 days.

SOFTWARE
Modeling: Paraform, Maya 4.5. Animation and dynamics: Maya 4.5. Rendering: mental ray 3.2. Compositing: Shake 2.51. Custom software: Universal Capture for facial animation, water-surface effects, and wet appearance created through custom Maya plug-ins and custom mental ray shaders. OS: Windows 2000.

HARDWARE
PC/Intel dual 1.3 GHz CPU, 2 GB RAM. Rendering farm: 100 CPUs.

Nike "Gamebreakers"

Broadcast & Commercials, Length 5:30

Director
David Fincher

Executive Producer
Ed Ulbrich

Visual Effects Supervisor
Eric Barba

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Under the direction of David Fincher, Digital Domain created a 60-second commercial that pitted Michael Vick and Terrell Owens against a team of 35 defenders. This CG commercial required four months of continuous working and reworking the animation to create the look and feel of a cold-winter-night football game. Each scene was previsualized in Lightwave. The stadium, grass, and clothing were modeled in Lightwave. Particle FX (snow, steam) were done with Digital Domain's proprietary software, Voxel B. Motion-capture data of the football players were brought into Kaydara Motion Builder to be repositioned and choreographed. All secondary animation was done in Maya. Players were then textured, lit, and rendered in Lightwave. All elements were composited in Nuke and Flame.

PRODUCTION
Modeling: Coliseum modeled from survey data using our proprietary tracking software and Lightwave 3D. Players were cyberscanned, but only their faces were cleaned up and used. The raw scans of the bodies were used as templates and modeled from scratch in Lightwave 3D. Motion capture blended with keyframe animation. Some rotoscoping used. Rendering technique used most: Lightwave 3D utilizing a combination of image-based rendering and conventional lighting. Average CPU time for rendering per frame: NA Total production time: four months. Production highlight: Developed a pipeline to go in and out of Filmbox, Maya, Lightwave, and Houdini. This allowed us to use the best features of each package.

SOFTWARE
Modeling: Lightwave 3D 7.5c. Animation: Maya 4.5 and FilmBox. Rendering: Lightwave 3D 7.5c. Dynamics: Maya 4.5, Houdini. Compositing: Nuke 4, Flame. Additional software: Cyberscan, Track, Photoshop 7. OS: Win2k and Linux.

HARDWARE
2.4 GHz dual CPU, 2 GB RAM. Graphics card: NVIDIA Quadro750XGL.

Onimusha 3

Character Animation, Length 6:02

Director
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Producer
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The time is 16th-century Japan, in the age of civil wars. The wicked demon king, Nobunaga, is about to conquer the country. A man with armor powered by demons, Samanosuke, enters the final fight with his old enermy, Gargant.

This is a mixture of Japanese Ninja and Samurai sword-fighting and an acrobatic kung-fu action movie.

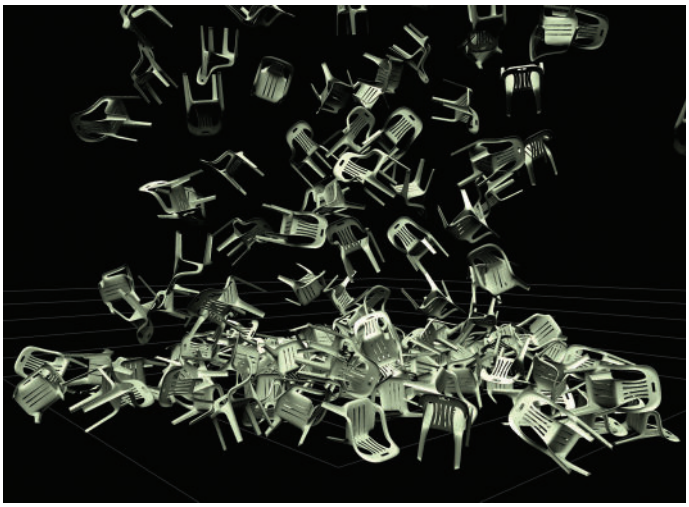
PRODUCTION
Modeling: Clay models for reference. We modeled most characters in 3D. Motion capture blended with keyframe animation. We used a VICON mocap system with 24 cameras and a capture area of 12.6 x 8.6 x 5 m. Some rotoscoping used. Rendering technique used most: HDRI lighting. Average CPU time for rendering per frame: approximately 15 minutes. Total production time: 540 days. Production highlight: Live-action background plates and motion-captured characters rendered with HDRI lighting.

SOFTWARE
Modeling and dynamics: Discreet 3ds max 5.1. Animation: Discreet 3ds max 5.1, Character Studio 4.0. Rendering: Chaos Software V-Ray 1.09.03m. Compositing: Adobe After Effects 6.0. OS: Windows XP Professional.

HARDWARE
PC single 2 GHz (or higher) CPU, 2 GB RAM.

Output-Sensitive Collision Processing for Reduced-Coordinate Deformable Models

Experimental Animation, Length 1:52



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This animation shows offline animations of deformable collision phenomena created using a new collision-detection bounding volume hierarchy called a Bounded Deformation Tree, or BD-Tree (James & Pai, 2004). This algorithm can make collision detection for reduced-coordinate deformable models as asymptotically cheap as with rigid models. The bounding volumes of a BD-Tree can be updated in any order following deformation, and without need for explicit access to the deformed geometry. Consequently, collisions with very large and/or numerous models can be processed at very modest costs on the CPU, with deformations synthesized in programmable graphics hardware. In all of our examples, deformable collision, contact, and multibody dynamics processing are typically faster than rendering all models using programmable hardware (NVIDIA Quadro FX 3000). Our animation shows that large-scale physically based deformable simulations can be achieved at little more than the cost of rendering. The final chair sequence involves 3,601 chairs, with more than 60 million deforming triangles and 1.6 billion sphere-collision events, and has a mean collision processing cost of two seconds per time-step.

REFERENCE

James, D.L. & Pai, D.K. 2004. BD-tree: Output-sensitive collision detection for reduced deformable models. ACM Transactions on Graphics (Proceedings of ACM SIGGRAPH 2004).

PRODUCTION

Modeling: Finite element deformation. Rendering technique used most: Vertex programs for graphics hardware accelerated synthesis of physically based deformation (for example, DyRT) and lighting (for example, pre-computed radiance transfer). Average CPU time for rendering per frame: for scenes involving approximately 60 million triangles, hardware rendering took several seconds per frame. Total production time: final video frames and modeling, approximately one week (not including R&D). Production highlight: No fish were harmed in this production.

SOFTWARE

Modeling: Emacs. Animation: proprietary software. Rendering: OpenGL (GL4Java). Dynamics: proprietary, BD-Tree. Compositing: None. Additional software: Emacs, Java 2. Custom software: All of it. OS: Windows XP Pro.

HARDWARE. Dual Xeon 3 GHz CPU, 2 GB RAM. Graphics card: NVIDIA Quadro FX 3000. Hardware rendering was used for final renders.

Parenthèse

Animation, Length 6:12

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In the agitation of the town center, a little man realizes that time goes by.

PRODUCTION
Modeling: Polygons. Rendering technique used most: Global illumination, radiosity, multiple pass. Average CPU time for rendering per frame: 10-30 minutes. Total production time: 18 months. Production highlight: This project is a school project, and we worked on the script and the storyboard for one year. We created small plug-ins to animate the cars and rendered in three different passes (textured background paper, lights and shadows, and toon shader). We rendered some scenes at the Discreet Center rendering farm in Belgium.

SOFTWARE
Modeling and animation: 3ds max 5.1. Rendering: 3ds max 5, Vray 1.08. Dynamics: Maya 4.5. Compositing: After Effects 5.5, Combustion 2. OS: Windows NT 2000.

HARDWARE. PC/Intel single 2 GHz CPU, 1 GB RAM. Rendering farm: approximately 15 CPUs. Graphics card: NVIDIA Geforce.

The Parthenon

Architectural, Length 2:30

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Paul Debevec

Producers
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Lora Chen
Maya Martinez

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This animation uses new computer graphics research to present a visualization of the Parthenon and its sculptures. The sculptures are shown in their current location in the British Museum, as well as where they were originally placed on the Parthenon. The film begins with models of the Parthenon's frieze, metopes, and pediment sculptures. These sculptures were scanned from high-quality casts in the Skulpturhalle Basel using a custom-structured light 3D scanning system. A Christian column carving and a Turkish-era cannonball impact were recorded on-site using a photometric stereo technique. Using high-dynamic-range time-lapse illumination, a complete day of light is simulated on a 90-million-polygon model of the Parthenon obtained through laser scanning the structure with a Quantapoint time-of-flight laser range scanner. Fifty-three panoramic scans were assembled using the MeshAlign 2.0 software from CNR Pisa and post-processed using GSI's GSI Studio software. New inverse global illumination reflectometry techniques were used to recover lighting-independent texture maps for the Parthenon, and renderings were created using Monte Carlo-based global illumination. The time-lapse image-based lighting was chosen from one of several days recorded in Marina del Rey, California using a new HDR capture process. Rendering this sequence virtually allowed us to show the Parthenon without scaffolding and tourists, and to design the camera moves and lighting in postproduction. The sequence ends with a sunset seen from a virtual reconstruction of the Erechtheion featuring scanned models of the Caryatid figures.

The sculptures were transported from Athens to London by Lord Elgin in the early 1800s. To show the sculpture's current location, a 3D model of the Parthenon Gallery in the British Museum was created using the Façade photogrammetric modeling system. Details were added using traditional modeling in Maya. Texture maps were created from "unlit" digital photographs, with absolute color and reflectance values determined using a color reference chart to correctly simulate indirect light within the museum. Photographs of the real sculptures in the museum were projected onto the geometry scanned from the cast collection to produce the virtual models seen in the museum. Because we did not have a useful model of the torso of Poseidon, the final shot in the museum sequence was accomplished through a new combination of silhouette-based reconstruction and view interpolation. High-dynamic-range lighting and image-based rendering were used to create the virtual camera moves in the museum.

The film's final sequence uses all of these techniques together to perform several cross-dissolves between the sculptures in the museum and the locations they once occupied on the Parthenon. In one transition, the polychromy of the frieze is restored to a conjectured painted coloration based on archaeological reconstructions, and the Parthenon is seen as it stood on the ancient Acropolis.

The entire film was rendered in high dynamic range using the Arnold renderer, a Monte Carlo-based global illumination system.

PRODUCTION
Modeling: Laser scanning, photogrammetry. Rendering technique used most: Monte Carlo Global Illumination. Average CPU time for rendering per frame: one hour (on a dual 2.4 GHz Pentium IV). Total production time: 58 days. Production highlight: The Parthenon model was built from 53 panoramic laser scans taken over five days in Athens, with textures derived from digital photographs and a custom inverse global-illumination algorithm. The sculptures were scanned using a custom-structured light scanner from plaster casts in the Skulpturehalle Basel and texture-mapped with digital photographs of the originals in the British Museum. The British Museum was modeled in Maya, making use of photogrammetric measurements from the Façade modeling system.

SOFTWARE
Modeling: Maya 5, Facade 1.0, MeshAlign 2.0, GSI Studio. Animation: Maya 5. Rendering: Arnold 2.0. Compositing: HDR Shop 2.0, Additional software: Adobe Premiere Pro, Adobe After Effects 6.0. Custom software: The Facade photogrammetric modeling system, the Arnold renderer (Global Illumination), HDR Shop (HDR image editing), ZIGI Inverse Global Illumination system to derive the Parthenon's reflectance properties. OS: Windows 2000, RedHat Linux.

HARDWARE
PC Intel 2.4 GHz CPU, 2 GB RAM. Rendering farm: 37 CPUs.

Music: "Mozart: Great Mass in C Minor K. 427 'Kyrie.'" Performed by Berliner Philharmoniker/Herbert Von Karajan. Courtesy of Deutsche Grammophon under license from Universal Music Enterprises.

PGi-13

Character Animation, Length 3:50

Director
Shim, Beom Sik

Producer
Shim, Beom Sik

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PGi-13: Parental guidance suggested for the protection of children's imagination under the age of 13.

After dinner one evening, I became suspicious of the tea I was about to put into a steaming cup of water. What exactly was hidden in that foggy bag? Was it just the ordinary dried leaves of the box's friendly illustrations? I wondered if it might be something much spookier.

In a classroom, four children are waiting for a special imagination test. The children receive water and teabags from a giant metallic pot on the ceiling, and they begin to imagine they can revive their tea back to its pre-tea form. Each child is given a different type of tea. The first child has regular green tea. The second tea is made of dried butterfly wings. The third child gets his tea, too, but the last one is accidentally given tea rated "PGi-13." And the child begins to imagine without parental guidance.

PRODUCTION
Modeling: Polygons. Rendering technique used most: Mental Ray. Average CPU time for rendering per frame: 18 minutes, ranging from 10 minutes to three hours. Total production time: four months. Production highlight: Many kinds of alpha-channel sequences were needed to create this animation. I created the alpha channel for the pouring-water sequences using soy sauce and a glass cup and made the alpha-channel sequences for the climax scene by recording a silhouette of hands projected on a white cloth with a 6mm-lens DV camera.

SOFTWARE
Modeling, animation, and dynamics: Maya 5.0. Rendering: Mental Ray 3.2. Compositing: After FX 6.0. Additional software: Photoshop 7.0.

HARDWARE
PC/Intel P4 single 2.4 GHz CPU, 512 MB RAM. Rendering farm: 8 CPUs. Graphics card: Nvidia Gforce4.

The Polar Express

Feature Film, Length 3:10

This selection showcases Imagemotion™, the proprietary technology developed by Sony Pictures Imageworks for "The Polar Express," an all-CG performance-capture feature film. The production required a system that would allow Tom Hanks to perform as multiple synthetic characters, including the main role of a young boy. A primary creative goal was to preserve the actor's performance by capturing the facial and body motion together in a single session. The fidelity of this capture data would need to be at a level never before attempted. Previous incarnations of motion capture techniques have recorded body and facial data in separate sessions that are combined to create a performance. Often the result looks stilted and artificial, because it lacks the natural unity of face and body while the actor is performing.

Imageworks created a capture volume that could simultaneously record high-fidelity facial and body motion for up to four performers. This involved ganging a high density of motion capture cameras positioned to provide 360 degrees of recording coverage for the four performers.

Other processes were also developed to create this presentation. A unique virtual camera system was created to allow a live-action camera operator to choreograph camera movements on the digital characters after motion capture was applied. This system allowed for a more cinematic feel to the movement of the camera. Significant advancements in digital cloth, effects animation, lighting, and compositing also contributed to the unique look of this piece.

PRODUCTION

Motion capture blended with keyframe animation. Rendering technique used most: Various third-party and proprietary techniques. Average CPU time for rendering per frame: N.A. Total production time: approximately 24 months. Production highlight: Advanced performance-capture technology and techniques to deliver realistic human performance in a fully CG feature movie.

SOFTWARE

Used custom tools developed specifically for the show, including Imagemotion technology, a proprietary motion capture system developed by Imageworks, combined with internally developed facility tools and off-the-shelf software. OS: various.

Director
Robert Zemeckis

Senior Visual Effects Supervisors
Ken Ralston
Jerome Chen

Visual Effects Producer
Craig Sost

Animation Supervisor
David Schaub

Motion Capture Shoot Supervisor
Demian Gordon

Environment Model Supervisor
Kevin Hudson

Look Development Supervisor
Cliff Brett

Character Pipeline Supervisor
Bert Van Brande

Simulation Supervisor
Sho Igarashi

Matte Painting Supervisor
Ivo Horvat

Digital Production Managers
Katherine Concepcion
Mandy Tankenson

Visual Effects Executive Producer
Debbie Denise

Digital Producer
Chris Juen

Computer Graphics Supervisors
Rob Bredow
Mark Lambert
Alberto Menache
Sean Phillips

Motion Capture Integration Supervisor
Albert Hastings

Character Model Supervisors
Edward Taylor
Marvin Kim

Character Technology Supervisor
J.J. Blumenkranz

Layout Supervisor
James Williams

Effects Supervisor
Daniel Kramer

Pipeline Supervisor
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SIGGRAPH 2004 Presentation Contributors
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HARDWARE

Motion-capture technology using Imageworks' proprietary Imagemotion system. Multiple systems including Dell, IBM, HP, Apple, SGI, and others; many with NVIDIA graphics cards. Rendering farm: Thousands of CPUs (primarily Intel).

Rock The World

Animation, Length 2:40

Contributors
School of Visual Arts

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George W. Bush, the president of United States, goes to meet the Secretary of State, Colin L. Powell, in the military conference room. They activate two launchers in the room. The launchers come up out of the floor and start shaking until the gates of the launchers open. Finally, a microphone and a guitar pop out of the gates, and they play rock music to unfavorable public opinion.

Software: Maya, Photoshop, After Effects, Final Cut Pro, ProTools.

PRODUCTION
Modeling: Polygon and subdivision surfaces. Keyframe character aanimation using video clips shot as reference. Rendering technique used most: Multiple-pass rendering; character, background, and shadows, each in a separate layer. Average CPU time for rendering per frame: 30 minutes. Total production time: approximately 600 days. Production highlight: Facial expression is a focus of my animation. I have experience in sculpting the human body, and I made more than 50 target faces of each character to achieve fluent facial expressions using blend shapes.

SOFTWARE
Modeling and animation: Maya 4.5. Rendering: Maya 5. Compositing: Adobe After Effects 5.5. Additional software: Final Cut Pro 3. OS: Windows XP.

HARDWARE
PC/AMD dual 1.67 GHz CPU, 1 GB RAM. Rendering farm: 10 CPUs.

RockFish

Animation. Short version; 3:12, shown in Electronic Theater.
Full version; 8:00, shown in Animation Theater.

"RockFish" is a comic-book-influenced, high-adventure tale set on a barren planet in a distant corner of the galaxy. Sirius Kirk is a no-nonsense working man tasked with rounding up creatures that "swim" through rocks far below the planet's surface and plague the miners who live and work there. The story starts out as just another day on the job for Kirk but quickly turns into a titanic struggle with the catch of his life.

PRODUCTION
Modeling: Polygons. Used motion capture as a base and blended keyframe animation on top to modify and enhance the performance. Used only keyframe animation on the non-human characters and a mix of keyframe and dynamics simulations for mechanical and FX animation. Rendering technique used most: All background plates were rendered and lit separately with a simple five-points lighting rig. Characters and vehicles were rendered and lit with one main keylight on top of a Brazil skylight. Average CPU time for rendering per frame: 35-90 minutes., depending on shot complexity. Total production time: approximately 800 person-days, spread out over several months. Production highlight: Employees of Blur Studio were asked to submit their ideas for an all-CG animated short, and the studio then voted on the entries. In a collaborative effort with Blur Studio, the winner got the chance to create a short funded by Blur Studio. Because everyone was so passionate about this project, we were able to complete the 800-day production in actually 500 calendar days! Rendered at 2K spatial resolution.

SOFTWARE
Modeling and animation: 3d studio max 5.1. Rendering: Brazil 1.02. Dynamics: ClothFX 1.0. Compositing: Digital Fusion 4. Additional software: Adobe Photoshop 7, Adobe Premiere 6, Iridas Framecycler Professional 2.7. Custom software: A lot of custom scripts, to help scene assembly and render stages, most freely available on the Blur beta site (www.blur.com/blurbeta/). Also developed our own network render manager. OS: Windows 2000.

HARDWARE
Workstations: IBM Intellistation with dual Intel Xeon 2.8-3.06 GHz CPUs, 2 GB RAM. Rendering farm: 300+ CPUs, Angstrom dual AMD Athlon 2600, 2 GB RAM. Graphics card: Nvidia 900 XGL and 980 XGL.

Director
Tim Miller

Writer
Tim Miller

Story
Tim Miller
Jeremy Cook
Paul Taylor
Chuck Wojtkiewicz

Visual Effects Supervisor
Jeremy Cook

Art Director
Jeremy Cook

Animation Supervisors
Jeff Weisend
Tim Miller

Storyboards and Concept Art
Chuck Wojtkiewicz
Sean McNally

Layout Animator
David Nibbelin

Animators
David Nibbelin
Luc Degardin
Jean Dominique Fievet
Makoto Koyama
Davy Sabbe
August Wartenberg
Remi McGill
Jeff Wilson
Jeff Weisend
Wim Bien
Onur Yeldan
George Schermer
Jeff Fowler
Jason Taylor
Derron Ross
Cemre Ozkurt

Modelers
Heikki Anttila
Irfan Celik
Jeremy Cook
Jerome Denjean
Kevin Margo

Finishing and Lighting
Jerome Denjean
Heikki Anttila
Kevin Margo
Jeremy Cook
David Stinnett
Dave Wilson
Sebastoen Chort

Producer
Sherry Wallace

Visual Effects
Daniel Perez Ferreira
Seung Jae Lee
Kirby Miller
Sung-Wook Su

Rigging and Cloth Simulation
Paul Hormis

Animation Technical Director
Jon Jordan

Motion Capture Supervisors
John Bunt
Jeff Weisend

Title Design
Jennifer Miller
Wonhee Lee

Motion Capture Actor
James Silverman

Production Coordinator
Debbie Yu

Production Assistant
Amanda Powell

Programming and Systems Administration
Duane Powell
Dave Humpherys
Daemeon Nicolaou
Matt Newell
Barry Robison

Music
Rob Cairns

Sound Design and Recording
Gary Zacuto
Richard Gray
Pete Kneser

Film Recorder
Title House Digital

Film Processing
Fotokem

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Shrek 2

Feature Film, Length 3:32

"Shrek 2," the sequel to the Academy Award-winning blockbuster "Shrek," sends Shrek, Donkey, and Princess Fiona on a whirlwind of new adventures.

After battling a fire-breathing dragon and the evil Lord Farquaad to win the hand of Princess Fiona, Shrek now faces his greatest challenge: the in-laws. Shrek and Princess Fiona return from their honeymoon to find an invitation to visit Fiona's parents, the King and Queen of the Kingdom of Far, Far Away. But no one could have prepared them for the sight of their new son-in-law, not to mention how much their little girl had ... well ... changed. Now the King must enlist the help of a powerful Fairy Godmother, the handsome Prince Charming, and that famed ogre killer Puss 'n Boots to put right his version of "happily ever after."

One of the most visually rich and technically challenging computer-animated films to date, "Shrek 2" was created by an award-winning team of over 300 artists, computer animators, software developers, and engineers at PDI/DreamWorks.

"Shrek 2" features numerous technical advancements in believable characters (facial animation, skin, hair, fur, and clothing), global illumination, special effects, and natural phenomena.

Directors
Andrew Adamson
Kelly Asbury
Conrad Vernon

Editor
Michael Andrews
Production Designer
Guillaume Aretos

Visual Effects Supervisor
Ken Bielenberg

Supervising Animators
Raman Hui
Tim Cheung
James Baxter

Producers
Aron Warner
David Lipman
John H. Williams

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SIGGRAPH 2004 ILM Research and Development

Feature Film, Length 4:35

Van Helsing ©2004 Universal Studios. All rights reserved.

A compilation of feature-film segments illustrating recent research and development work at ILM. Film clips from “Pirates of the Caribbean,” “Harry Potter and the Prisoner of Azkaban,” and “Van Helsing” show techniques developed for photorealistic human performances (character setup, paint, and materials for digital doubles); complex cloth, skin, and hair dynamics under artist control; and simultaneous recording of live-action and motion-capture performances for hybrid CG characters.

Directors
Steve Sullivan
Brent Bowers

Producer
Ken Maruyama

Contributors
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ILM Post Production Coordinator

Ellen Pasternack
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PRODUCTION
Modeling: NURBS, polygons, and subdivision surfaces. Animation: combination of keyframe and motion capture (traditional onset, and realtime). Simulations: cloth, hair, and flesh simulated with proprietary tools. Roto and Compositing: combination of 2D and 3D techniques.

SOFTWARE
Modeling: Isculpt (proprietary). Animation: XSI, Maya, Zeno Poseur (proprietary); Cari (proprietary). Rendering: RenderMan. Dynamics: Zeno Hair, Cloth, Rigid Body Simulation (proprietary) Cari cloth and Flesh Simulation (proprietary). Compositing: Comptime (proprietary). Additional software: Zeno Mars (proprietary) Zeno Commodore (proprietary) Zeno Zenviro (proprietary) and a whole bunch more. OS: Linux.

HARDWARE
Single CPU PCs. Rendering farm: 2,500 CPUs.

Spider-Man 2

Feature Film, Length 2:42

Director
Sam Raimi

Visual Effects Designer
John Dykstra

Visual Effects Executive Producer
Jenny Fulle

Animation Supervisor
Anthony La Molinara

Computer Graphics Supervisors
Peter Nofz
Daniel Eaton
Seth Maury
Ken Hahn

Visual Effects Supervisor
Scott Stokdyk

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Lydia Bottegoni

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"Spider-Man 2" features the introduction of Doc Ock, a new character that Spider-Man has to interact with on many levels. Like the CG Spider-Man, a synthetic version of Doc Ock had to be created for situations where it was not practical to use the real actor, a stunt man, or puppeted tentacle arms. The challenge was to blend and integrate different methods for putting Doc Ock into a shot.

Similar to the building pipeline developed on the first Spider-Man, the creation of Doc Ock relied heavily on photographic data and techniques, including Paul Debevec's reflectance field acquisition work. The challenge for Imageworks was to integrate this with skin, hair, cloth, and tentacles into a production environment that allowed flexibility to meet the demands of different shots.

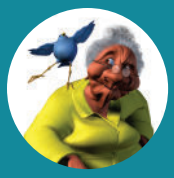
This "Spider-Man 2" excerpt shows a progression of the Doc Ock character in the story. It features shots with different execution techniques, as well as interstitial glimpses of pieces that went into the full CG Ock creation, including footage acquired on the Light Stage at USC's Institute for Creative Technologies.

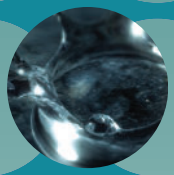
PRODUCTION
Modeling: NURBS converted to subdivision surfaces; virtual New York City is a mix of polygonal and subdivision surfaces with a few NURBS patches later converted to subdivision surfaces. Facial motion capture to capture performance details of Alfred Molina and Tobey Maguire, and blended with keyframe facial animation; body motion capture for background characters. Minimal rotoscoping used. Rendering technique used most: RenderMan with ambient occlusion and ambient reflection. Average CPU time for rendering per frame: five minutes-eight hours. Total production time: 700 days. Production highlight: Production editorial sent us cut movie sequences via a fiber connection, and we evaluated the shots in a review room equipped with a NEC 1K DLP digital projector calibrated to film. This significantly reduced our average amount of filmouts per shot. The shots in progress were cut into the latest sequence for color-accurate shot review in context. The complex geometry of the CG city was enhanced with lighting techniques such as secondary caustic reflections, lightrays shining through corner building offices, and improved HDR interiors. The CG Doc Ock was our best combination of IBR (HDR fisheye lighting images were obtained for every sequence on-set) and traditional CG light placement. ICT's Light Stage data was the basis of Ock's facial skin rendering, and the real breakthrough for us was being able to integrate this technique into our pipeline and have it coexist with our more standard setups.

SOFTWARE
Modeling, animation, rendering, dynamics, and compositing: a variety of off-the-shelf software; internally developed facility tools; and custom tools developed specifically for the show. Additional software: The House of Moves mocap; Kaydara Motionbuilder (for editing body mocap). Custom software: 3D volume shattering; data management tools; improved in-house hair-pipeline; improved cloth simulation developed by Alias; in-house muscle tools for facial motion capture; tools to extract reflectance functions from scanned ICT Light Stage film images of principal actors; virtual light stage system to aid paintwork on the Light Stage photography. OS: various.

HARDWARE
Multiple systems including Dell, IBM, HP, Apple, SGI and others, many with NVIDIA graphics cards. Rendering farm: Thousands of CPUs (primarily Intel).

Animation Theater





1may

Experimental Animation, Length 0:60

Director
Daniel Zdunczyk

Producer
Daniel Zdunczyk

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Hyper-rrealistic rendering with simulated motion dynamics. With its maximum attention to detail, this movie is intended to turn viewers' attention from the original film's destination and create the impression that we are watching a real world, filmed with an amateur camera. It is supposed to blur the border between the real world and the computer-generated view, and answer an important question: Can virtual reality be interpreted as reality, and how easy is it to cheat the human eye?

PRODUCTION
Modeling: 3ds max tools. Rendering technique used most: Scanline area shadow. Average CPU time for rendering per frame: 15-30 minutes Total production time: one month. Production highlight: used standard tools and techniques, no compositing.

SOFTWARE
Modeling, animation and rendering: 3ds max 5.0. Additional software: Adobe Premiere 5.1. OS: Windows XP.

HARDWARE
PC/AMD 1.7 GHz CPU, 512 MB RAM.

3 Phasen

Experimental Animation, Length 2:00

Director
Daniel Holzwarth

Producer
Filmakademie Baden-Württemberg

Animation
Daniel Holzwarth
Chistian Sawade-Meyer

Contact
Prof. Thomas Haegele
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Three short, dream-like visions. The intensity of the moment and the emotional expression of each individual scene are emphasised more than story-telling.

PRODUCTION
Modeling: polygons. Rendering technique used most: normal scan-line. Average CPU time for rendering per frame: three minutes. Total production time: two months. Production highlight: unusual fractal surface on one model.

SOFTWARE
Modeling, animation, and rendering:3ds max 5. Compositing: After Effects 5. OS: Windows 2000.

HARDWARE
Athlon single 1.4 GHz CPU, 1.5 GB RAM.

Annie & Boo

Character Animation. Short version; 1:30, shown in Electronic Theater.
Full version; 14:30, shown in Animation Theater.

Director
Johannes Weiland

Producer
Michael Schaefer

Music
Andi Groll

Writer
Dirk Stoppe

Contact
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For the first time in her life, a teenage girl named Annie meets a real coincidence. His name is Boo, and Boo has never met a girl before.

PRODUCTION
Modeling: Subdivision surfaces and NURBS. Rendering technique used most: Maya software renderer. Average CPU time for rendering per frame: approximately 3-6 minutes. Total production time: 2.5 years.

SOFTWARE
Modeling: Maya 4.0. Animation, rendering, and dynamics: Maya 4.5. Compositing: Digital Fusion 4.0. Additional software: Photoshop 7.0. Custom software: “rain setup,” MEL script for specialized rain, written by Matthias Zeller. OS: Windows NT/ XP.

HARDWARE
PC/Intel single 2 GHz CPU, 1 GB RAM. Rendering farm: approximately 15 dual CPUs. Hardware rendering was used for final renders of some effects. Graphics card: G-force 4.

Anthem

Animation, Length 1:00

Anthems are a powerful and insidious propagandistic format. They exist because they work. There is something about the structure and format of anthems that makes people believe. It makes people stand up and put their hands to their hearts. It makes us susceptible. It incubates allegiances, even inspires tears.

Psyop was inspired to turn this format on its head, to have fun with it and make an anthem for consumerism, a piece about buying and believing. The piece looks, sounds, and moves with all of the innocence and friendliness of a Saturday morning children's cartoon but with sardonic, politically aware content, as if Noam Chomsky were to write a commercial for a sugary breakfast cereal.

Visually, we wanted to create a look that was as soft and playful as possible and so saccharin it would distract you from the disturbing lyrics and message.

The process began with the lyrics and the music. Then we created storyboards and style frames that were recreated in 3D. Characters were modeled and rigged, the lighting and shading was designed, then the mad dash to finish the animation.

Directors
Kylie Matulick
Todd Mueller

Designers
Kylie Matulick
Todd Mueller
Marie Hyon
Justin Fines
Haejin Cho
Pal Moore
Daniel Piwowarczyk

Executive Producer
Justin Booth-Clibborn

Technical Directors
Todd Akita
Marko Vukovic

Modeling and Animation
Alvin Bae
Christian Bach
Gerald Ding
Kevin Estey
Domel Libid
John Wade Payne

3D Modeling
Tom Cushwa
Todd Akita
Alvin Bae

Particle Effects
Eric Lampi

Compositors
Todd Akita
Marko Vukorie
Aska Otake

Producers
Daniel Rosenbloom
Joe Hobaica

Lyrics
Steve Raymond

Synths and Drum Programming
Jed Boyar

Live Drums and Guitars
Joel Hamilton

Brooklyn Bass and Additional Music Production
Tony Maimone

Piano
Reverend Vince Anderson

Vocals
Dave Driver

Kid Voices
Thomas Ashton
Thomas Hourigan
Henry Rosenbloom
Molly Rosenbloom

Special Thanks
Cat Oberg

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PRODUCTION
Modeling: polygons. Rendering techniques used most: ambient occlusion, final gathering, non-photorealistic rendering. Average CPU time for rendering per frame: 20 minutes. Total production time: four weeks. Production highlight: used global-illumination techniques in a stylized effect.

SOFTWARE. Modeling and animation: XSI 3.5. Rendering: XSI 3.5, Mental Ray Compositing: After Effects. Additional software: Photoshop, Illustrator. OS: Windows 2000, IRIX 6.5.

HARDWARE
PC 2.4 GHz CPU, 1 GB RAM. Rendering farm: 8 CPUs.

Autoglass "Cracks Catch Up With You"

Broadcast & Commercials, Length 0:40

Director
Daniel Levi

Producer
Zoe Rogers

3D Artist
Yafei Wu

2D Artists
Duncan Horn
Ludo Fealy

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A man spots a chip in his car windscreen and dismisses it without a thought. As he walks away from his car, we see that the chip suddenly starts to grow into a crack that takes on a life of its own. The crack starts to chase the man as he tries to escape from it in a lift, an office, a street, and finally an underground station. The last shot shows the crack finally catching up with him and working its way from his shoes up to his hands, where we catch a glimpse of his fingers falling off!

Our challenge was to produce photorealistic cracks in 3D using Maya 5.0, which were enhanced by 2D and 3D dust and rubble after initially making an animatic so we could work out the design, speed, and journey of the crack.

PRODUCTION
Modeling: polygons. Rendering technique used most: Maya scanline renderer; also camera mapping, procedural texturing. Average CPU time for rendering per frame: one minute Total production time: three months.

SOFTWARE
Modeling, animation, rendering, and dynamics: Maya 5. Compositing: Discreet Flame. Additional software: After Effects, Photoshop. OS: Windows 2000.

HARDWARE
AMD Athlon dual 1.7 GHz CPU, 1 GB RAM. dware rendering was used for final renders. Graphics card: Nvidia Quadro 4.

The Balloon

Character Animation, Length 3:25

Director
Bum-Jin Lee

Producer
Ringling School of Art and Design

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This animation explores the possibilities of what might happen when dreams affect our conscious lives. When the line between life and death hangs in the balance, dreams can become nightmares.

PRODUCTION
Modeling: Maya subdivided polygons. Rendering technique used most: Maya software and hardware renderers. Average CPU time for rendering per frame: seven minutes. Total production time: seven months. Production highlight: In my thesis project, I used a script to control the string of a balloon. This script would cause the string to follow the balloon when it was moved, keeping the string straight. Another script that I used was for controlling multiple blend shapes on a single slider.

SOFTWARE
Modeling, animation, and dynamics: Maya 5.0. Rendering: RenderMan (Alfred 5.5.4). Compositing: Shake. Additional software: Premiere 6.0. OS: Windows XP.

HARDWARE
PC/Intel dual 2.6 GHz CPU, 1.5 GB RAM. Rendering farm: approximately 150 CPUs. Hardware rendering was used for final rendering of particle sequence. Graphics card: Quadro FX 2000.

BMW X3: “Any”

Broadcast & Commercials, Length 0:60

Director
Paul Street

Visual Effects Supervisor
Fred Raimondi

Visual Effects Producer
Mark Kurtz

CG Supervisor
Greg Teegarden

Compositing Supervisor
Katie Nook

Executive Producer
Ed Ulbrich

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At first glance, this BMW spot, directed by Paul Street for Fallon Mineapolis, looks like a pretty easy gag. A car driving in all four seasons. But wait. A closer look reveals that not only is the car driving in all four seasons, but the camera is also moving around the car, the screen is divided by an X with a different season in each quadrant of the X, and the car is PERFECTLY REGISTERED in each quadrant. Shot over three weeks in New Zealand, a combination of careful production planning, live-action photography, compositing, 3D cars, and 3D environments created this seamless spot filled with an illusion that begs to be watched over and over and over and over...

PRODUCTION
Modeling: Lightwave. 2D and 3D rotoscoping used. Rendering technique used most: Lightwave and Inferno. Average CPU time for rendering per frame: 30 minutes. Total production time: six weeks (post-production schedule). Rendered at 2K resolution.

SOFTWARE
Modeling: Lightwave, Terragen. Animation: N/A. Rendering: Lightwave. Compositing: Nuke, Inferno. Custom software: Nuke. OS: Windows 2000.

HARDWARE
PC 2 GHz CPU, 2 GB RAM.

Cécile sans paupières

Animation, Length 7:49

Directors
Manuel Ferrari
Daniel Garnerone
Johan Gay
Sandrine Lurde

Producer
Supinfocom Arles

Contributors
One Plus One

Contact
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Lili, the boyish girl, is chasing her caterpillar, when she meets Cécile, a small girl without eyelids. Complicity between the two young girls pushes Lili to help Cécile to get out of her dark cellar.

PRODUCTION
Modeling: polygons. Rendering technique used most: 3ds max scanline renderer. Average CPU time for rendering per frame: NA. Total production time: one year. Preproduction, five months. 3D production, two weeks post-production. Production highlight: challenging caterpillar animation, skinning with bones, added two or three different flexes.

SOFTWARE
Modeling, rendering, and dynamics: 3ds max 5.0. Animation: 3ds max 5.0, Character Studio 3.0. Compositing software: Combustion 2.0, After Effects 6.0. OS: N.A.

HARDWARE
PC single CPU, 2 GB RAM. Graphics card: Ge force3.

Dahucapra Rupidahu

Animation, Length 6:47

Director
F. Gyuran
V. Gautier
T. Berard

Producer
Supinfocom Valenciennes

Contributors
One Plus One

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Documentary about an endagered animal.

PRODUCTION
Modeling: polygons. 2D rotoscoping used for a few scenes. Rendering technique used most: 3ds max scanline renderer with domelight system. Average CPU time for rendering per frame: 4-10 minutes. Total production time: eight months.

SOFTWARE
Modeling, animation, and rendering: 3ds max 5.1. Dynamics: 3ds max 5.1, Shag hair plug-in. Compositing: Combustion 2.0. Additional software: Icarus. OS: Windows 2000.

HARDWARE
PC 2 GHz CPU, 1 GB RAM.

De Huisspitsmuis

Animation, Length 0:47

Director
Ben Toogood

Producer
NCCA, Bournemouth University

Supervisor
Paula Callus

Contact
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A digital "Albert Durer," a very well-executed study in motion and modelling. Ben models and animates the rat-like animal so "accurately" that his work has all the lifelike properties of a real creature even though it is totally artificial. The photo-realistic style and the accuracy of animation give this piece a vivid dreamlike quality.

PRODUCTION
Modeling: principally NURBS. Animation: keyframe (with some use of rotoscoping, and 'mouse' motion capture). Rendering technique used most: PRman for the majority of the rendering, complemented with some hardware rendering. Average CPU time for rendering per frame: approximately one hour. Total production time: nine months.

SOFTWARE
Modeling, animation, and dynamics: Maya 4. Rendering: PRman10. Compositing: Shake 2. Additional software: boujou for tracking. Custom software: project management tools. OS: Windows 2000.

HARDWARE
PC single 1 GHz CPU, 512 MB RAM. Rendering farm: 25 CPUs. Hardware rendering was used for final renders.

Dear, Sweet Emma

Animation, Length 5:17

Director
John M. Cernak

Producer
Out of Our Minds Animation Studios, Inc.

Contributors
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Danny Oakley
Keith Hobgood
Derek Cernak
Rebecca Cernak
Lori Cernak
Ian Bloom
Gene Johnson

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lori@outofourmindsstudios.com

As the search is given up for Emma's latest husband, Tucker, a private look reveals that Emma has a secret and uncontrollable dark side. The sweetest angel and favorite citizen of Fishtickle would indeed pose an uncomfortable dilemma for all if her problem were ever found out.

PRODUCTION
Modeling: Subdivision surfaces. Rendering technique used most: Lightwave. Average CPU time for rendering per frame: 10 minutes. Total production time: 60 days. Production highlight: We really busted butt with this one. From the initial drawing of the storyboards to a finished piece was 60 days. Not bad, since there were only six people working on it, and of those six only two were able to work on it full time.

SOFTWARE
Modeling, animation, and rendering: Lightwave 7.5c. Compositing: After Effects. Additional software: Video Toaster. Custom software: Worley Labs Sasquatch plug-in for Lightwave for Emma's Hair. OS: Windows 2000.

HARDWARE
PC 3 dual CPUs, rest single 900 MHz-2.4 GHz CPU, 512 MB-2 GB RAM. Rendering farm: 4 CPUs.

DIGITALSNAPSHOT: Minute Manipulations of Space, Place, and Time

Art & Design, Length 5:00

Director & Producer
Lo Iacono

Concept & Compositing
Lo Iacono

Camera
Schuchardt
Zimmerman
Mohr
Mustatic
Meyer

Music
Michael Kadelbach

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"DIGITALSNAPSHOT" is similar to music-video animations that deal with the correlation of digital manipulations and candid documentary shots. It was produced as part of a media design diploma thesis from the Univerty of Applied Sciences, Mainz ,Germany in 2003. Discreet combustion and REALVIZ ReTimer were used to produce this clip.

What does a moment look like? Can snapshots freeze a moment in time?

In "DIGITALSNAPSHOT," motion fragments were captured and rearranged in a new visual context via unconventional digital manipulations. A long-take camera-movement cycle generates a unique "digital painting" that enables the viewer to experience a virtual walk through a beautiful park in summertime.

PRODUCTION
Some rotoscoping used. Average CPU time for rendering per frame: NA. Total production time: six months (two months preproduction, six weeks shoot, three months post production). Production highlight: "DIGITALSNAPSHOT" is a kind of "doku-animation" that plays with the correlation of candid documentary shots and digital manipulation. Motion fragments were captured and rearranged in a new visual context. Ninety percent of the clip is based on candid documentary shots.

SOFTWARE
Compositing: combustion 2. Additional software: realviz retimer. OS: Windows 2000.

HARDWARE
PC/Intel single 2 GHz CPU, 1.5 GB RAM. Rendering farm: 6 CPUs. Graphics card: Geforce 4 (gainward).

Drift

Art & Design, Length 0:60

Psyop conceptualized, designed, and directed "Drift," a 60-second art film for Bombay Sapphire. They were asked to create a piece that speaks to elements of Bombay Sapphire's brand: alluring spirit, style, sophistication, complexity, and depth.

Psyop built the story through performances, editing, and camera work. They moved away from an understandable sense of space to create a sense of intrigue and other-worldliness. Viewers never see a horizon line, or know how deep or shallow the space is, because Psyop chose to express space and environment through lyrical animation and camera moves. When the camera pans across the scene and subtly shifts to an overhead from a side-angle shot, it happens so organically that it doesn't feel jarring, and consequently delivers a sense of relaxation.

Psyop enhanced the story by paying specific attention to composition, palette, and environment. Visual techniques were inspired by traditional Japanese screen painting of panoramas, where space is abstracted. Psyop meticulously developed the atmosphere so that it had a waterlike, daydream-ish quality. Shades of blue undulate, echoing the brand identity of Bombay Sapphire.

Technology: Softimage XSI, Flame, Adobe Illustrator, Photoshop, After Effects, digital and film cameras to shoot the work.

Directors
Kylie Matulick
Todd Mueller

Producer
Daniel Rosenbloom

Design and Animation
Psyop

Designer and Director
Kylie Matulick
Todd Meuller

Executive Producer
Justin Booth-Clibborn

Technical Director and Development
Todd Akita

Flame Artist and Composite
Eben Mears
Roi Werner

Animation Artists
Todd Akita
John Clausing
Tom Cushwa
Kevin Estey
Eric Borzi
Kent Seki

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PRODUCTION
Modeling: polygons and NURBS, transparency mapping, and fur objects for foliage. Average CPU time for rendering per frame: 5-30 seconds. Total production time: six weeks.

SOFTWARE
Modeling, animation, and dynamics: XSI 3.0. Rendering: XSI 3.0, Mental Ray 3.0. Compositing: After Effects, Flame. OS: Windows 2000, IRIX 6.5.

HARDWARE
PC 2.2 GHz CPU, 1 GB RAM. Rendering farm: 6 CPUs.

Eiu esperu

Animation, Length 4:26

Directors
Damien Stumpf
Mickaël Lorenzi

Producer
Supinfocom Valenciennes

Contributors
One Plus One

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In Provence, an old man is waiting for the rain to fall and save his dry garden.

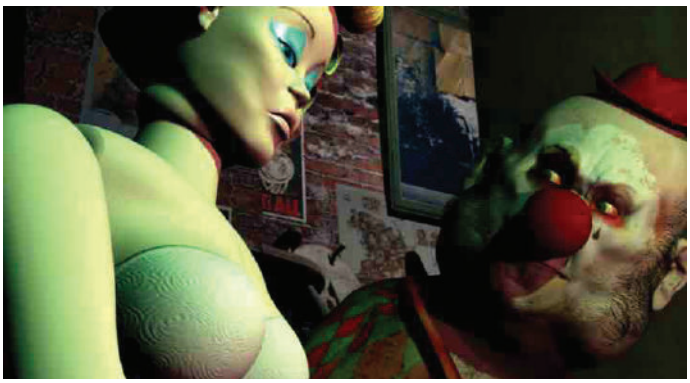
PRODUCTION
Modeling: polygons. Some 2D rotoscoping used. Rendering technique used most: Maya renderer. Average CPU time for rendering per frame: approximately two minutes, depending on the number of renders by scene. Total production time: one year. Production highlight: Unusual rendering style between a painting and a realistic rendering.

SOFTWARE
Modeling, animation, and rendering: Maya 4.5. Compositing: Photoshop, Digital Fusion. Additional software: Adobe Premiere, edit. OS: Windows 2000.

HARDWARE
PC 1.4 GHz CPU, 1 GB RAM.

El Desván

Character Animation. Shorter version; 2:05, shown in Electronic Theater.
Full version: 19:20, shown in Animation Theater.



Director
José Corral

Producer
José Corral

Script and Editing
José Corral

Sound Mixing
Fernando Pacostales

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"El Desván" won first prize for animations produced in Spain at ArtFutura 2003 and won the Best Animated Award of the Spanish Academy of Cinematography.

The 27-year old director says: "I made the film because my girlfriend left me; there're no other reason. It's my first film, and I really enjoyed a lot making it. I'm already working on another one."

PRODUCTION
Modeling: NURBS. Rendering technique used most: Maya renderer. Average CPU time for rendering per frame: four minutes. Total production time: 730 days (500 for 3D animation, the rest for scriptwriting, sound, and post-production).

SOFTWARE
Modeling, animation, rendering, and dynamics: Maya 4.0. Compositing: After Effects 4.1, Jaleo. OS: Windows NT.

HARDWARE
Modeling, texturing, and some animation on a PC single 300 MHz CPU Some animation and rendering on a PC single 2 GHz CPU; both 512 MB RAM. Graphics card: S3 VIRGE 2 MB, and GForce2 64 MB.

ESPN "Evolution"

Broadcast & Commercials, Length 0:30

Director
Motion Theory

Creative Director
Mathew Cullen

Designers
Kaan Atilla
John Clark
Paulo De Almada
Tom Bruno
Tom Bradley
Chris De St Jeor
Ryan Alexander

Producer
Javier Jimenez

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We know dinosaurs evolved from birds, and humans from apes, but just how did skateboarders arise? "Evolution," the only animated installment in ESPN's "Without Sports" campaign, answers that question in less than 30 seconds, while simultaneously echoing the campaign's overall theme of the interconnectedness of sports and life.

"Evolution" begins with a surfer riding a wave to the tune of the Jimi Hendrix classic "Ezy Rider." Soon, the surfboard sprouts wheels, "evolving" into a skateboard. The surfer then becomes a skateboarder as the environment and animation style progress through the 70s, 80s, and 90s. After riding up the side of an empty pool, the skateboarder sails off the end of a modern-day half-pipe, spinning into the clouds and leaving the tagline Without sports, evolution would just be a theory.

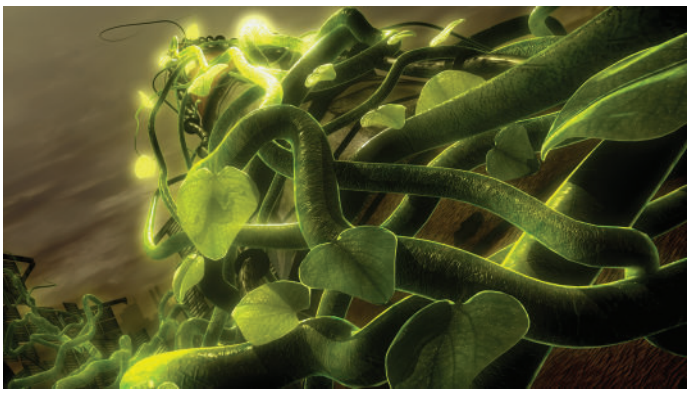
PRODUCTION
Modeling: polygon and subdivision surfaces for characters, NURBS for environments. Some 2D rotoscoping used on a couple skateboard moves. Rendering technique used most: toon shading. Average rendering CPU time per frame: 10 minutes. Total production time: 90 days. Production highlight: This project was unusually challenging because in 30 seconds there were four complete style changes, which included even the clothes of the character, all in a single camera move. Each style was a different era of skateboard history.

SOFTWARE
Modeling, animation, rendering, and dynamics: Maya 4.0. Compositing: After Effects. Additional software: Photoshop, Illustrator. OS: Windows XP

HARDWARE
PC/Intel Xenon dual 2.4 GHz CPU, 1.5 GB RAM.

The Fall

Character Animation, Length 2:59



Director
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Producer
Ringling School of Art and Design

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A small vine grows on the edge of a cliff, completely unaware of the ruthless upheaval in its future. The vine becomes curious about the new presence in the distance, when suddenly the vine's world is completely turned upside down. The result is a life-and-death struggle between humans and nature.

PRODUCTION
Modeling: NURBS and subdivided polygons. Rendering technique used most: ray-traced shadows with a raycast beauty pass. Used Shake to composite the layers and post-process the image using simulated depth of field with the Z buffer image. Additional filters were used for blurring effects and color correction. Average CPU time for rendering per frame: 10-15 minutes. Total production time: approximately 300 days (from preproduction to finished project). Production highlight: The production process at Ringling School of Art and Design is special because of the people. We have constant faculty critiques, teachers meet with students on their own time, students critique each other on a constant basis.

SOFTWARE
Modeling, animation, rendering, and dynamics: Maya 5.0. Compositing: Shake 2.51. Additional software: Adobe Photoshop 7.0.1, Body Paint 2, Premiere 6.5. OS: Windows XP 2002.

HARDWARE
IBM Intellistation Z Pro dual 2.67 GHz CPU, 1.5 GB RAM. Rendering farm: 200 CPUs. Graphics card: NVIDIA Quadro FX 2000.

First Life

Animation, Length 4:03

Director
John Bair

Content Director
Amy L. Maddox

Graphics Producer
Tai Uhlmann

Project Manager
Kathleen Bober

Writer
Lorraine Markus

Assistant 3D Animator
Nathan Meier

Producer
Joseph Cortina

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An animated exploration of the probable course of events that transformed a molten rock on the edge of a galaxy into an Earth teeming with microscopic life. In a blend of three complex camera moves, the film traces our origins through massive changes in scale ranging from the entire Milky Way down to a single molecular reaction, all combined in a synthesis of scientific accuracy and picturesque aesthetics. While primarily CGI, the visual effects in "First Life" utilize a blend of animation with the practical photographic special effects employed by early science fiction films. Water tank and ink effects were used to create some of the billowing volcanic smoke and atmospherics, and fluorescent-dyed oatmeal pouring over greenscreen was photographed and manipulated to produce lifelike lava flows.

PRODUCTION
Modeling: standard box modeling with polygons. Extensive 2D rotoscoping was used to extract some of the practical elements that were shot on DV. Rendering technique used most: 3ds max default scanline renderer. Average CPU time for rendering per frame: approximately five minutes. Total production time: two months. Production highlight: Shooting some of the smoke and lava elements as practical effects was a nice alternative to using excessive amounts of 3D particles. The snippets of practicals also helped to add an organic tinge to the extensive CG environments.

SOFTWARE
Modeling, animation, rendering, and dynamics: 3ds max 5.1. Compositing: After Effects 5.5. Additional software: Adobe Photoshop 7.0. OS: Windows 2000 Pro.

HARDWARE
PC/Intel dual 1.7 GHz CPU, 1.5 GB RAM. Rendering farm: 10 CPUs. Graphics card: Fire GL X1.

Fortune Teller

Character Animation, Length 2:17

Director
Sung Chung

Producer
Ringling School of Art and Design

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Sometimes we need help realizing the significance of other people in our lives. Often, we take them for granted, never considering the potential impact they may have on our future. It can be overwhelming to learn that your true fortune lies in your own hands.

PRODUCTION
Modeling: subdivision surfaces. Rendering technique used most: Maya software renderer. Average CPU time for rendering per frame: approximately two minues. Total production time: approximately 240 days. Production highlight: Had a shortage of production time due to early SIGGRAPH 2004 summission deadline.

SOFTWARE
Modeling, animation, rendering, and dynamics: Maya 5.0. Compositing: Shake 2.5. Additional software: Premiere 6.0. OS: Windows XP Professional.

HARDWARE
IBM Intellistation 2.6 GHz dual CPU, 1.5 GB RAM. Rendering farm: 200 CPUs.

Frank

Animation. Short version; 1:45, shown in Electronic Theater.
Full version; 5:40, shown in Animation Theater.

Director
Taruto Fuyama

Sound Designer
Keiichi Kitahara

Story & Character Design
Jim Woodring

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This work is an animation of a part of Jim Woodring's comic series “Frank,” known as “Pushpow.” It is a joint project with the publisher that first produced the Japanese version of “Frank.” I created it as part of a bigger project that seeks to produce an animation of “Frank” using the techniques and interpretations of several of my animator colleagues who are “Frank” fans. This work is the first phase of the project. Subsequently, a number of works have been created using a diverse range of methods such as clay and collages, and all of them have been very well received by Jim Woodring. This version explores how to best express the movements of the characters using computer graphics without deviating from the image style and world view of the original work.

PRODUCTION
Modeling: Softimage XSI. Rendering technique used most: characters rendered with Mental Ray, especially Toon Shader. Most backgrounds are hand-drawn and mapped onto 3D objects. Average CPU time for rendering per frame: one-five minutes. Total production time: three months. Production highlight: all production by a single person.

SOFTWARE
Modeling and animation: Softimage XSI 3.5, AURA 2. Rendering: Mental Ray. Compositing: AURA 2. Additional software: Premiere 6.5 Pro Tools. OS: Windows 2000.

HARDWARE
PC/Intel P4 single 2 GHz CPU, 1 GB RAM.

Gala Bingo: Spiders

Broadcast & Commercials, Length 0:30

The humorous ads entitled “Dog,” “Spiders,” and “Car Wash” all bear the trademark Traktor stamp and build up to the strapline: “Everyone loves a winner.” In “Dog,” a huge hound checks himself out in the bathroom mirror, brushes his teeth, gargles, and generally spruces himself up in readiness to greet his Gala Bingo winner owner by slobbering all over her and licking her face enthusiastically. In “Spiders,” two CG spiders with human heads are deep in conversation in the bath before jumping down the plug hole into “spider heaven,” leaving the tub free for the Gala Bingo winner to have a soak. In “Car Wash”, CCTV reveals a man “stealing” a Gala Bingo winner’s car, only to put it through the best car wash and return a sparkling motor, much to the owner’s astonishment.

Director
Traktor

Agency
Leo Burnett

Creative Directors
Jonathan Budds, copywriter
Anita Davis, art director

Agency Producer
Claire Taylor

Production Company
Partizan

Production Company Producer
Lucy Sherwood

Editor
Andrea MacArthur

Post Production Company
The Moving Picture Company

Post Producer
Graham Bird

Creative Head of 3D
Jim Radford

3D Animators
Stephen Jolley
Simon Thomas
Alp Boysan

Inferno Artists
Christophe Allender
Alex Lovejoy

Telecine
Jean-Clement Soret

Contact
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PRODUCTION
Modeling: polygons and subdivision surfaces. Rendering technique used most: Mental Ray with Final Gather. Average CPU time for rendering per frame: 40 minutes. Total production time: six weeks. Production highlight: use of proprietary software for diffuse lighting effects.

SOFTWARE
Modeling, animation, and dynamics: Maya 5. Rendering software: Mental Ray. Compositing: Inferno. Custom software: Numerous Maya Plug-ins. OS: Linux.

HARDWARE
PC Intel dual 1.7-2.6 GHz CPU, 2 GB RAM. Rendering farm: 100 CPUs.

THE GOD

Animation, Length 4:20

Even a god might have to reincarnate to get rid of a pesky fly.

PRODUCTION
Modeling: Polygons. Rendering technique used most: Mental Ray. Average CPU time for rendering per frame: Approx. 7 min. Total production time: Two years. Production highlight: The dust was shot on Digital Beta SP videotape format. SOFTWARE. Modeling, animation and rendering: Softimage 3D. Compositing: After Effects 4.5. Additional software: TOONZ 4.4. OS: Windows 2000. HARDWARE. PC/Intel dual 750 MHz CPU, 1 GB RAM. Rendering farm: 2-3 CPUs. Hardware rendering was used for final renders. Graphics card: OXIGEN 32 MB.

SOFTWARE
Modeling, animation and rendering: Softimage 3D. Compositing: After Effects 4.5. Additional software: TOONZ 4.4. OS: Windows 2000.

HARDWARE
PC/Intel dual 750 MHz CPU, 1 GB RAM. Rendering farm: 2-3 CPUs. Hardware rendering was used for final renders. Graphics card: OXIGEN 32 MB.

Director
Konstantin Bronzit

Producers
Sergey Selyanov
Alexander Boyarsky

Music
Valentin Vasenkov

Sound
Vladimir Golounin

Animation
Konstantin Bronzit

Computer Graphics
Yuri Ilin

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Alexander Boyarsky
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Hairy & Scary

Character Animation, Length 5:36

Directors
Jan Van Rijsselberge

Producer
Alphanim

CG Production
Menfond Electronic

Created & Designed by
Jan Van Rijsselberge

Pilot produced in association with
Happy Life

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The story is all about two totally opposite civilizations, Hairies and Scaries. The Scaries chose technology and an oppressive profit-based belief system, while the Hairies opted for spirituality and a rather austere ecological philosophy. The only thing they shared was their mutual mistrust of each other. Until the day when two kids, Constance and Shloofy, a girl and a boy, a Scary and a Hairy, formed a group of friends who meet in the border zone, sneaking back and forth between worlds to have fun.

There were always technical challenges during the production of "Hairy & Scary." We used 3ds max 5.1 for modeling, motion, and rendering. G buffer channel was our solution to overcome the difficulties of motion blur. Using Max Platform, we developed our own tools for efficiency purposes. Also, two shaders (Hairy world & Scary world) were created to illustrate the complex variations in the color shaping of the two camps.

Entirely done in 3D in a simple and very colourful design," Hairy & Scary" highlights impressionistic sets and a large number of characters.

PRODUCTION
Modeling: polygons. Rendering technique used most: scanline rendering, proprietary shader. Average CPU time for rendering per frame: approximately five minutes. Total production time: 90 days. Production highlight: Limited number of lights to control the rendering times. The creative aspect of the project is the result of the merging of French and Chinese cultures.

SOFTWARE
Modeling, animation, and rendering: 3d max R5. Dynamics: Shag plug-in for hair simulation. Compositing: After Effects 5.0. OS: Windows NT/2000.

HARDWARE
1 GHz CPU, 1 GB RAM. Rendering farm: 20 CPUs. Graphics card: NVIDIA Quadro fx 500 and Oxygen VX1.

The Haunted Mansion

Feature Film, Length 2:36

Director
Rob Minkoff

Visual Effects Supervisor
Jay Redd

Visual Effects Producer
Jacquie Barnbrook

Digital Effects Supervisor
Pete Travers

Effects Lead
David Stephens

Lighting Lead
Jim McLean

Visual Effects Executive Producer
Jenny Fulle

Animation Supervisor
Troy Saliba

Computer Graphics Supervisor
Darren Lurie

Compositing Lead
Bob Peitzman

Shader Lead
Brian Steiner

Contact
Jerome Schmitz
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Seamlessly combining practical and digital effects, Imageworks artists conjured up nearly "999" ghostly effects for the film. A combination of SteadiCam, real-time motion control and bluescreen photography was used in shooting the "ghosts." For the cemetery sequence, the team used a 360-degree bluescreen stage and composited 60+ separate blue-screen passes together for the final shot.

When ghosts are seen interacting with other ghosts and humans, to preserve transparency, the team used 3D roto processes. To achieve an ethereal, yet energetic look, costumers painted microscopic glass beads known as Scotchlite on each ghost's costume, causing light to reflect right back to its source. With a special light mounted on the motion-control camera, these beads would light up and sparkle. With this unique photographic technique in place, the semi-transparent ghostly look was achieved digitally by using proprietary tracking software combined with optical-flow software to track movement of selected points from frame to frame. On top of this, plasma, energetic and ethereal effects were achieved through design of custom particle tools and shaders. All in, each ghost had over eight effects layers combined with 2D filtering and image processing.

For Madame Leota, Jennifer Tilly was shot with elaborate motion control photography separate from each set and actor. A full CG version of her head was created for scenes when Eddie Murphy is shown carrying the crystal ball. Digital makeup was applied to give her a glowing and luminescent skin. 3D sets were used for the spinning Seance Room sequence and particle "miniature storm" effects were created for inside the ball.

For the Singing Busts, unique animation controls were built and a faux "stop-motion" style was developed to achieve a "moving stone" look, along with the use of SSL (sub-surface-scattering) shaders to make the ancient marble busts seamlessly integrate with the background photography. Imageworks' proprietary Bonsai compositing software was used for over 300 shots for the film.

PRODUCTION
Modeling: NURBS. 2D and 3D rotoscoping used extensively. Rendering technique used most: RenderMan with custom shaders and heavy use of SSL (sub-surface-scattering) algorithms. Average CPU time for rendering per frame: two seconds to six hours, depending on imagery. Total production time: approximately 400 days, from preproduction to final release print. Production highlight: Unique collaboration among Visual Effects Supervisor (Jay Redd), Costume Designer (Mona May), Director of Photography (Remi Adefarasin), and makeup effects designer (Rick Baker) resulted in the first-time use on film of highly reflective microscopic mirrors, mixed into paint, and applied to costumes. With special lighting, these tiny mirrors created an image basis used for the organic plasma effects of the ghosts in the film.

SOFTWARE
Modeling: Maya 4.5, Houdini, RenderMan, Bonsai, Inferno, tons of custom code, fire and smoke effects are all proprietary code written to handle millions of particles. Animation: Maya 4.5, Houdini, RenderMan (yes, RenderMan for animated particles!) Rendering: RenderMan, Maya Renderer, custom DSOs, shaders, plug-ins, Photoshop for matte-paintings. Dynamics: Maya 4.5, Houdini, TONS of custom code for fire, plasma, smoke effects, proprietary dynamics tools. Compositing: Bonsai, Matador, Photoshop, Combustion, Inferno. Additional software: Imageworks frame rendering and management software, tons of custom code for organic effects. Custom software: custom shaders, particle systems, and animation controls. Maya, Houdini, and RenderMan function as front ends to our proprietary code. OS: Linux, Unix, Irix, Mac OS X, Windows NT/XP.

I'm Walking

Broadcast & Commercials, Length 2:25

Director
The Soulcage Department

Producer
Gero von Braunmuehl

Contributors
Elmar Keweloh
Joachim Bub
Michael Meyer
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Bodo von Braunmuehl

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What happens when six chickens compete in a hurdle race without having any knowledge of sports and its rules at all?! Well, how could they, they're just chickens!!

"I'm Walking" is a completely 3D animated commercial, screened in cinemas across Germany. A young, healthy rooster wins against five competitors from a laying battery, symbolized by a huge block of flats.

PRODUCTION
Modeling: Spline and Patch. Rotoscoping: 2D sketches were used in the viewport backgrounds for modeling. Rendering technique used most: Raytracing with a domelight setup. Average CPU time for rendering per frame: approximately seven minutes (all passes on a single CPU). Total production time: approximately 2.5 months.

SOFTWARE
Modeling, animation, rendering, and dynamics software: Hash Animation Master 10.0. Compositing: Adobe After Effects 5.5. Additional software: Anzovin Studios "The Setup Machine" 1.2. Operating system: Windows 2000 Professional.

HARDWARE
Single CPU average 2 GHz, average 1 GB RAM. Rendering farm: 8 CPUs.

Inseparable Bonds

Character Animation, Length 19:30

"Inseparable Bonds" offers a fresh alternative to "reality" television, presenting instead "surreality" television. Our host with the most, Sir Real, interviews his latest special guests, a couple who have merged mind, body, soul, and gender to become the one abominable character: Gareena.

The talking "heads" (Gareena character) were achieved by mapping steady-tracked footage of the actors onto 3D geometry. IK was then used to control the neck rotations. Since this is such a dialogue-intensive movie, a smart way to bring these two characters to life was essential. Animating the heads with a 3D-lip-sync solution would have been an extremely time-intensive affair. Sir Real, shot against blue-screen, acts on a 3D-CG stage and environment. The 3D "follow-spot" effect was enhanced by compositing "live-action" dust. The 3D "Gareena vehicle" is complete with 3D-particle exhaust smoke. The holographic "aura" effect on the Sir Real character was created with Maya particles. The Lady-Beetle was built to proportions of the actress via digi-stills, which were also used to create texture maps. The animation achieved via IK was based on the actress's dance, exaggerated with leaps etc. The "outro sequence" also features "helicopter chickens" – IK animation, multi-layered 3D particle fog, multi-layered 3D textural planes and objects, depth of field, and detailed shadow passes composited via Shake.

Director
Lars Magnus Holmgren

Sound Design
We Write Music Ltd
(Oliver Davis and Bouke Visser)

Camera and Lighting
Matt Lee-Redman

Editor
Alan Andrews

Cast
Stewart Harvey-Wilson
Helen Watkins
Richard Mazola
Michelle Ricci

Cast Representation
Olivia Bell Ltd

3D Animation
Lars Magnus Holmgren

Stage Manager and Gaffer
Robert Le Merle

Assistant Stage Manager
Michelle Ricci

Title Design/Credits Design
Lars Magnus Holmgren

2D Pre Visualisation
Andrew (Ziggy) Ziggourias,
Christophe Allender,
Paul O'Shea

Producer
Dominic Buttimore

Digital Compositing
Lars Magnus Holmgren

Steady Tracking
Francois Gilguy,
Lars Magnus Holmgren,
Ric Comline, Nick Seresin

Digital Matte Cutting
Richard McKeand

Key Grip
Jonathan Coutts

3D Particle R&D
Greg Massie

Data Management
Paul Stocker, Sal Umerji,
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Bookings
Sam Davidson, Oliver Money,
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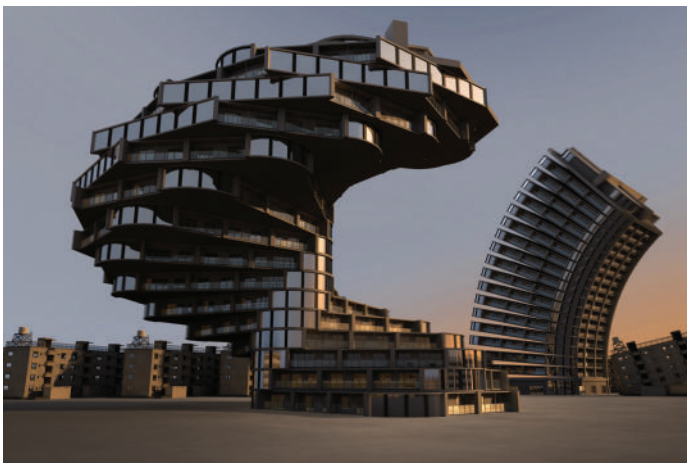
Japan

Art & Design, Length 2:00



Director
Nobuo Takahashi
Nagoya City University

Story
Nobuo Takahashi

Animators
Kan Ueta
Takashi Odagiri
Takeru Kosaka
Mitsue Nagasawa
Kentaro Homma

Music
Hironobu Yahata
0039.com

Producer
Naoki Hashimoto

Editor
Naoki Hashimoto

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After World War II, Japan accomplished an economic revival. The concentration of population in the cities came during the period of strong economic growth afterwards. Construction and housing development advanced rapidly. Positive financing of financial institutions was backed up during the economic bubble economic of the 1990s. As a result, large-scale, quasi-public corporations developed one after another. However, this development ended with the bursting of the bubble economy. Real estate value dropped sharply. Bad loans caused financial failures. A fiscal deficit was generated by the government's protection of financial institutions. In 2004, total debt held by the Japanese government has reached as much as 900 trillion yen.

PRODUCTION
Modeling: polygons. Rendering technique used most: Mental Ray's final gathering. Average CPU time for rendering per frame: 30 minutes – five hours. Total production time: five months. Production highlight: Students had a very strong and unique concept. Adjusting textures was challenging due to the mixed production environment: Maya and XSI.

SOFTWARE
Modeling, animation, rendering, and dynamics: Maya 5.0, SoftimageIXSI V3.5. Compositing: AvidIDS 4.0, Premiere 6.0. OS: Windows XP Pro.

HARDWARE
PC Intel Xeon single 3.2 GHz CPU, 1 GB RAM.

Kitaro The Movie

Animation, Length 4:02

Director
Tatsuya Nagamine

Producer
Shinji Shimizu

Contributors
Toei Animasion Co., LTD.

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This full-3D animation originated from the comic story called “Kitaro in the Graveyard.” We designed various Japanese-style monsters (yokai) in 3D and tried to transfer the treasure of the Japanese painting style into this visual image.

PRODUCTION
Modeling: Subdivision surfaces. Rendering technique used most: Maya renderer. Average CPU time for rendering per frame: five minutes. Total production time: 60 days.

SOFTWARE
Modeling: Maya 4.0. Animation, rendering, and dynamics: Maya 4.0. Compositing: After Effects 5.5. OS: Widows 2000.

HARDWARE
PC/Intel dual 2.8 GHz CPU, 2 GB RAM. Graphics card: Quadro 980X.

Louis

Animation, Length 5:17

A puppet discovers its show's backstage.

Directors
Olivier Barre
Nicolas Bruchet
Samuel Devynck

Producer
Supinfocom Valenciennes

Contributors
One Plus One

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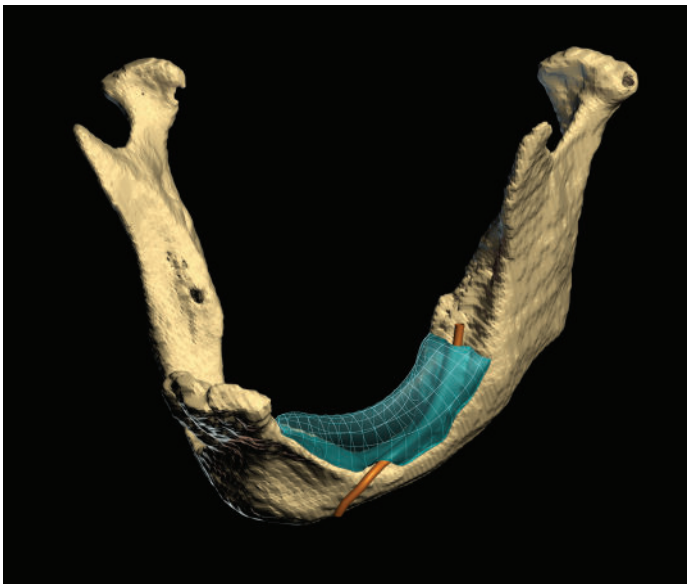
PRODUCTION
Modeling: polygons. Rendering technique used most: Basic scanline rendering. Average CPU time for rendering per frame: 5-15 minutes, depending on shot. Total production time: approximately 250 days, 150 for preproduction and 100 for production.

SOFTWARE
Modeling, animation, and rendering: 3ds max 5. Dynamics: Reactor for puppet's ropes. Compositing: Photoshop scripts, Combustion 2.1. Additional software: Illustrator 10, Photoshop 6, Premiere. OS: Windows 2000.

HARDWARE
PC/AMD single 2 GHz CPU, 512 MB RAM. Graphics card: Gforce4 ti 4200.

Mandible Reconstruction Project

Scientific Visualization, Length 2:20



Director & Producer
Benjamin Grosser

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The Mandible Reconstruction Project is an ongoing effort to develop an alternative approach to bone replacement. Using the case of a 73-year-old female who has experienced severe bone loss in the mandible, the multi-disciplinary team created a workflow to design and fabricate a custom artificial bone implant.

The process required extraction of a 3D model of the defect area from the CT scan data so the modelers could work with the surgeon to define and design the implant. Once created, the virtual model was fabricated using a “robocaster” – technology similar to a rapid prototyper, but one which works with custom materials. In this project, the robocaster was used to create structurally strong scaffolds of hydroxyapatite (a substance chemically identical to human bone), from which the implant was milled. During the patient’s autograft procedure, the implant was inserted into the defect and proved a perfect fit.

Since the device was not yet FDA approved, it was removed and used as a template for the bone graft. This first phase of the project demonstrated the feasibility of this approach in a real clinical setting, and the team looks forward to future research.

PRODUCTION
Modeling: polygons and subdivision surface. Rendering technique used most: Maya renderer, raytracing. Average CPU time for rendering per frame: 60 seconds. Total production time: eight weeks. Production highlight: The production utilized a scientific analysis and visualization software package called Analyze from the Mayo Clinic to produce the CT scan data-animation sequence and the isolated mandible model. The CT scan was acquired at Carle Hospital (Urbana, Illinois) on a GE Medical Systems Hi CT/i scanner. Development of the implant model was done in consultation with a clinical oral and maxillofacial surgeon to ensure medically acceptable accuracy with the model's congruence to the existing clinical features in the actual patient.

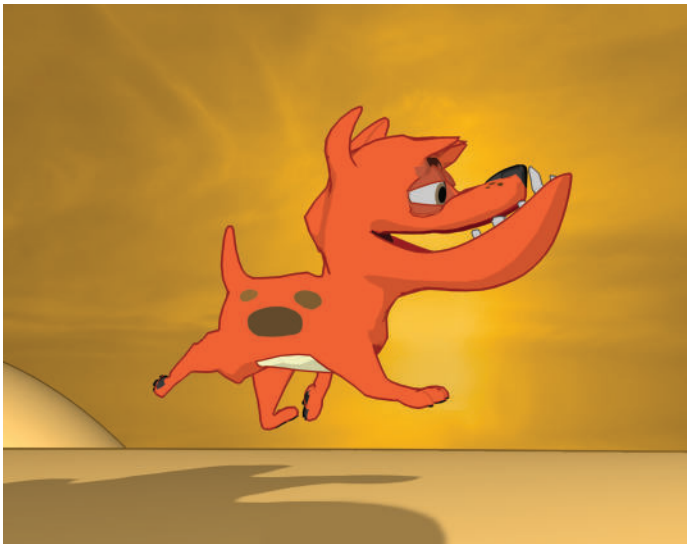
SOFTWARE
Modeling: Analyze 6.0 (skull, isolated jaw), Rhinoceros 3.0 (implant), Maya 5.0 (lattice, cells, other). Animation: Analyze 6.0 (skull animation), Maya 5.0 (everything else). Rendering: Maya 5.0. Compositing: Final Cut Pro 4.0. Additional software: Final Cut Pro 4.0, Photoshop CS. OS: Windows XP, Mac OS X 10.3, Red Hat Linux 9.

HARDWARE
Apple G4 dual 1.4 GHz CPUs, Intel Xeon dual 2.8 GHz CPUs, AMD Athlon dual 2 GHz CPUs; 2-4 GB RAM.

OTHER
This animation is potentially unique in its combination of medical visualization and analysis software for part of its modeling and animation contents, as well as the ways in which collaborations between researchers in materials science, 3D fabrication, medical illustration, computer modeling, and clinical surgery led to the development of the medically accurate (very high accuracy and/or very low tolerance for error) computer models used in the animation.

Man's First Friend

Animation, Length 2:53



Director
Allen Mezquida

Animator/Co-Writer
Tony Maki
Dan Bransfield

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How did caveman and canine become acquainted? "Man's First Friend" is the story behind their first encounter. This project was first and foremost story driven. We spent almost as much time getting the animatic solid as we did building out the movie (slight exaggeration).

Design-wise, it was very important to develop a "caveman" world that was NOT The Flintstones in any way. The rolling hills were influenced by the geography of San Lois Obispo.

I decided to go with a toon shader look to give the 3D environment a unique feel that I had not seen done in this way. A separate light system was set up to render a shadow pass only. This allowed for very clean individual control over the toon shader and the shadows as separate graphical elements that were composited later.

PRODUCTION
Modeling: Subdivision surfaces. Rendering technique used most: Every shot had two separate lighting setups. One for lighting the elements in the shot and one for the cast shadows. This insured total control over the look of the toonshader and then placement of the shadows as clean graphical elements. They were composited together in After Effects. Average CPU time for rendering per frame: approximately 3-4 minutes, sometimes longer given the fact that the toonshader calculation is based on a raytrace function. Total production time: 2.5 months. Production highlight: We brought in a creative piece for way under budget. There was no waste in the pipeline. It has its own style and look, yet the economic factors that were considered every step of the way did not lower the quality of the piece.

SOFTWARE
Modeling, animation, and rendering: 3d studio max 5.1. Compositing: After Effects 6. Additional software: Adobe Premiere 6.5, Photoshop 7. OS: Windows 2000.

HARDWARE
PC single 2 GHz CPU, 1 GB RAM. Graphics card: NVIDIA Quadro 4 750 XGL.

Massive Arabesque

Real-Time Graphics, Length 2:50

Director
Jim Berry

Producers
Jim Berry
C. Lawrence Zitnick

Contributors
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Jim Berry
Sing Bing Kang
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A meditation on music and dance featuring world-champion breakdancers, The Massive Monkees. Two people from diverse backgrounds come together to share their art.

The video demonstrates automatic generation of depth and matting information from live footage. View interpolation and object editing were accomplished using this information. The virtual footage may be generated and manipulated in real time.

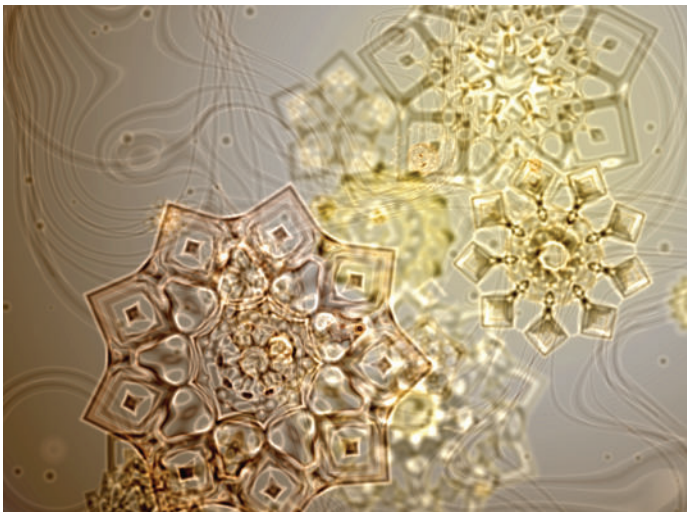
PRODUCTION
Modeling: A two-layer color and depth representation from eight stationary viewpoints. Rendering technique used most: New virtual-camera viewpoints were generated by warping and combining the two nearest real-camera viewpoints using image-based rendering. Average CPU time for rendering per frame: 2-5 seconds. Total production time: 90 days. Production highlight: All camera movement within this video is virtual. Eight stationary calibrated cameras were used to shoot the film. For each camera, depth maps and matting information were automatically extracted. This information was used for automatic view interpolation and object editing.

SOFTWARE. Modeling and rendering: proprietary software. Compositing: Adobe Premiere. Custom software: Almost the entire production, except the final compositing, was done with custom software developed at Microsoft Research. OS: Windows XP.

HARDWARE
Intel 2 GHz CPU, 1 GB RAM. Rendering farm: 3 CPUs.

MICROCOSM

Art & Design, Length 2:59



Director
Joe Takayama

Faculty Supervisor
Etsuo Genda

Contributors
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Shingo Harada
Yuichiro Yamashiro

Producer
Joe Takayama

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Looking through a microscope, we find the micro cosmos where many curious things exist: snowflakes, pollen, germs, and so on. Microbes such as freshwater algae are very interesting. Although their geometric cell structure is very simple, they reveal a variety of artistic forms. This work is an attempt to use original software to represent a micro world. Square metaballs (meta-cubes) were used as the main algorithm for modeling the algae-like objects.

PRODUCTION
Modeling: 2D metaballs (blobby model), especially square Metaballs (we call this method “Metacube”). Rendering technique used most: 2D rendering using original algorithm. In the beginning, objects were arranged and rendered on the multiple separated layers. Effects like gauss blur were configured per each layer. Finally, all layers were combined to one image. Average CPU time for rendering per frame: 2-3 minutes. Total production time: approximately 90 days. Production highlight: All objects shown in this work were generated autonomously using metaballs and random numbers. Properties like motion, color, and effects were also controlled by random numbers. No compositing.

SOFTWARE
Modeling, animation, and rendering: original software programmed in C. Additional software: Adobe Premiere 6.0 for combining movie clips and adding credits. Custom software: All parts of the image (modeling, animation, rendering, effects like gauss blur) were generated using custom software programmed using basic C functions only. API, like OpenGL, was not used in this project. OS: Windows XP Professional Edition.

HARDWARE
PC/Intel single 1.5 GHz Pentium-M CPU (Notebook PC), 512 MB RAM.

My Grandpa

Character Animation, Length 6:00

Director
Petr Marek

Producer
Petr Marek

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demaris@centrum.cz

The movie is a tribute to the geniality of my grandpa and his love for humanity. It's a realistic scene from my grandpa's and grandma's life that shows grandma's inability to understand grandpa's strong personality. It's an exaggerated attempt to mimic my grandpa´s light-speed thinking in 25 frames per second.

PRODUCTION
Modeling: proxy polygons (smooth proxy in Maya), and some NURBS. Rendering technique used most: Maya renderer with ray-tracing. Average CPU time for rendering per frame: Average of 18 minutes. Total production time: 540 days.

SOFTWARE
Modeling, animation, rendering and dynamics: Maya 4. Compositing: Premiere 6.5. Additional software: Photoshop 7, Vegas 4, Sound Forge. OS: Windows XP.

HARDWARE
PC/AMD Athlon single 1.7 GHz CPU, 512 MB RAM. Rendering farm: 2 CPUs. Graphics card: GeForce2 MMX.

Nike "Presto 04"

Broadcast & Commercials, Length 0:60

"Nike Presto 04" puts art into motion in urban landscapes. After the backgrounds were filmed in Tokyo and Shanghai, artists were filmed on stage in Los Angeles. The still works were then recreated using Maya and composited with the backgrounds. The piece features numerous forms of animation. Sometimes, we see the artists creating the original work, seemingly painting straight onto the cityscape. Other times, the animation seems to walk among the crowds, or between buildings.

The piece centers around a colossal DJ who spins records on a building-sized turntable, pumping out sound through massive speakers to create the beat of the city and the music that brings the art to life. Playful robots interact with geometric shapes and organic illustrations, all toward the goal of combining sound and form, and capturing the spirit of the art, landscape, and culture.

PRODUCTION
Modeling: NURBS for non-human characters, polygons, and subdivision surfaces for humans. Rendering technique used most: Maya renderer. Average rendering CPU time per frame: 5 minutes. Total production time: 45 days.

SOFTWARE
Modeling, animation, rendering, and dynamics: Maya 4.5. Compositing: After Effects. Additional software: boujou 1/3.

HARDWARE
PC Intel dual 2.4 GHz CPU, 1.5 GB RAM.

Director
Motion Theory

Creative Director
Mathew Cullen

Editors
Mark Hoffman
Jutta Reichardt

Artists
Skwerm
Sasu
Frek

Designers
Kaan Atilla
Irene Park
John Clark
Tom Bradley
Tom Bruno
Ryan Alexander
Chris De St. Jeor
Bridget McKahan
Mark Kudsi
Mike Slane
Shihlin Wu
Michael Steinmann
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Producer
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Nike "Speed Chain"

Broadcast & Commercials, Length 3:55

Director
David Fincher

Visual Effects Supervisor
Eric Barba

Visual Effects Producer
Stephanie Gilgar

CG Supervisor
Jay Barton

Compositor
Dave Stern

Executive Producer
Ed Ulbrich

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In this commercial for Nike directed by David Fincher for Weiden & Kennedy, Digital Domain, led by Visual Effects Supervisor Eric Barba, was tasked to create the illusion of animals and machines engaged in a relay race. Eric and his team created photo-real seamless animation of a jellyfish, a snake, and a train, and employed photogeometry to create POVs of all the participants in the race. The characters, photogeometry, and renders were done in Lightwave. The compositing was done in Nuke and Flame.

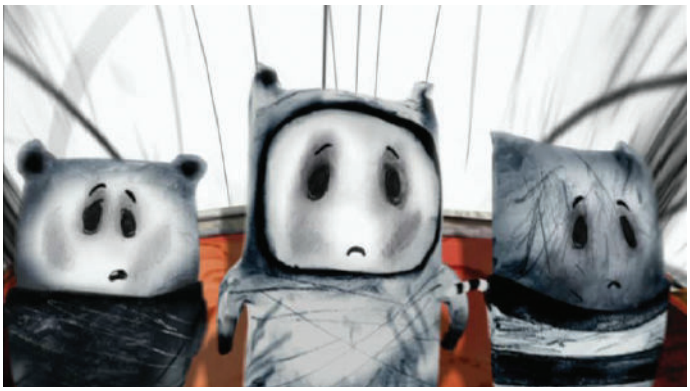
PRODUCTION
Modeling: Polygons and subdivision surfaces. 2D rotoscoping used only to create mattes from live action plates, not for animation. Rendering technique used most: Proprietary HDR lighting environment implemented through NewTek's Lightwave 3D. Average CPU time for rendering per frame: approximately 4-5 hours. Total production time: 45 days. Production highlight: Very fast schedule for a full-minute commercial at 2K resolution and anamorphic aspect ratio.

SOFTWARE
Modeling and animation: Maya 4.0, Lightwave 7.5. Rendering: Lightwave 7.5. Compositing: Nuke 3.0, Inferno. OS: Windows 2000, Linux.

HARDWARE
PC Intel dual 2 GHz CPU, 2 GB RAM.

no limits

Animation, Length 1:00



A social argument for children's rights.

Director
Heidi Wittlinger

Producer
Tobias Lindörfer

Animation
Heidi Wittlinger
Max Stolzenberg
Anja Perl

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PRODUCTION
Modeling: polygons. Rendering technique used most: layer-based Mental Ray renderer. Average CPU time for rendering per frame: 5-8 minutes. Total production time: approximately 90 days.

SOFTWARE
Modeling and animation: Maya 5. Rendering: Maya 5, Mental Ray. Compositing: Digital Fusion. OS: Windows XP Professional.

HARDWARE
Dual 2 GHz CPU, ea. 2 GB RAM. Rendering farm: 40 CPUs.

Oddworld Stranger CG Intro

Animation, Length 2:30

Director
Lorne Lanning

Art Director
Raymond Swanland

Production Designers
Raymond Swanland
Silvio Aebischer

Animator
Rich McKain

Technical Director
Iain Morton

CG Tools Programmer
Rob Tesdahl

Editor
Josh Heeren

Producer
Josh Heeren

Sound Designer/Composer
Michael Bross

Voices
Lorne Lanning
Michael Bross

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In the Mongo River Valley, water privatization has brutally depleted and displaced its native inhabitants. These dire circumstances are of little concern to Stranger, a bounty hunter focused on his own savagely guarded secrets. He gathers living ammunition (giving new meaning to the term “live ammo”) in a garden of graves to prepare for the bounty ahead. In a flash of fur and a series of deft maneuvers, he turns the tables and fells his Outlaw, making it clear who is hunting whom. Back at the bounty store, he claims his due. As he steps out, ready for the next Outlaw, this stranger is completely unaware of his fate and its inevitable collision with that of the Mongo River Valley.

PRODUCTION
Modeling: polygons, some NURBS. Rendering technique used most: Maya renderer. Average CPU time for rendering per frame: 25 minutes. Total production time: 180 days. Production highlight: The entire sequence was created with one CG artist, one animator, one CG tools programmer, and one production designer. Matte paintings were used extensively to achieve the desired look and feel of the sequence.

SOFTWARE
Modeling, animation, and rendering: Maya 4.5. Dynamics: Maya 4.5, custom plug-ins. Compositing: Shake 2.51. Additional software: Photoshop 7.0, Combustion 3.0. Custom software: Custom plug-ins and scripts for dynamic hair and particles, and pipeline/productivity tools. OS: RedHat Linux.

HARDWARE
PC/Intel dual XEON 2.8 GHz CPU, 2 GB RAM. Rendering farm: 42 CPUs. Graphics card: FireGL 2. OTHER: Our latest rendering system includes Angstrom's Opteron Hyperblades.

Offspring "Hit That"

Broadcast & Commercials. Length 2:58

Directors
John Williams
David Lea

Producer
Russell Mclean

Contributors
Andrew Ruhemann
Cath Berclaz
Mark Wilson
Chris Hemming
Jason Nicholas
David Sigrist
Stuart Hall
Stuart Rowbottom
Wes Coman
Nikos Gatos
Antoine Moulineau
Matt Everitt
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A video by Williams and Lea that mixes real with unreal. To achieve this, they created strong, graphically designed characters – part men, part prosthetic, and part CG. The video involved most of the in-house CG team at Passion Pictures to produce the character animation and lip sync. Rushes were responsible for the telecine and Inferno work to create the video's atmospheric live-action settings. Realise Studios handled the CG tracking for the eyes and mouths, and fellow Passion director Darren Walsh and Scary Cat Studios made the masks.

The video features a manic dog on a wild rampage from his suburban home to the depths of the city. His owner tracks him down after following his chaotic path (overturned bins, a half eaten leg, and fallen lamposts), determined to tame his wild beast. The chase reaches its climax with the dog surrounded by his owner, a vet, and the dog's angry illegitimate puppies.

Directors Williams and Lea: "All of our previous projects have been extremely low budget, so it was a nice change for us to be able to work with a full film production crew, model makers, and a Great Dane!"

PRODUCTION
Modeling: Subdvision surfaces. Rendering technique used most: Lightwave renderer, mainly shadow-mapped lights. Average CPU time for rendering per frame: approximately two minutes. Total production time: 35 days. Production highlight: The process of making the "Hit That" promo was trial and error. The directors used many techniques both in camera and in post production to bring all the elements together. The total post-production time was little more than two weeks, so many creative short cuts had to be devised.

SOFTWARE
Modeling: Lightwave 7.5. Animation: Messiah Studio 1.5. Rendering: Lightwave 7.5. Compositing: After Effects 5.5, Flame. Additional software: boujou. Custom software: SuperBlender plug-in for Messiah used for facial animation and Point Oven 1 used to take animation from Messiah to LW. OS: Windows 2000 sp3.

HARDWARE
PC/Intel dual P4 Xeon 3 GHz CPU, 2 GB RAM. Rendering farm: 125 CPUs.

Otsu

Animation, Length 5:38

Directors
Lucas Vallerie
Mathieu Gastaldi
Sylvain Crombet

Producer
Supinfocom Valenciennes

Contributors
One Plus One

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An old mad scientist living in a rubbish dump dreams of reaching the moon.

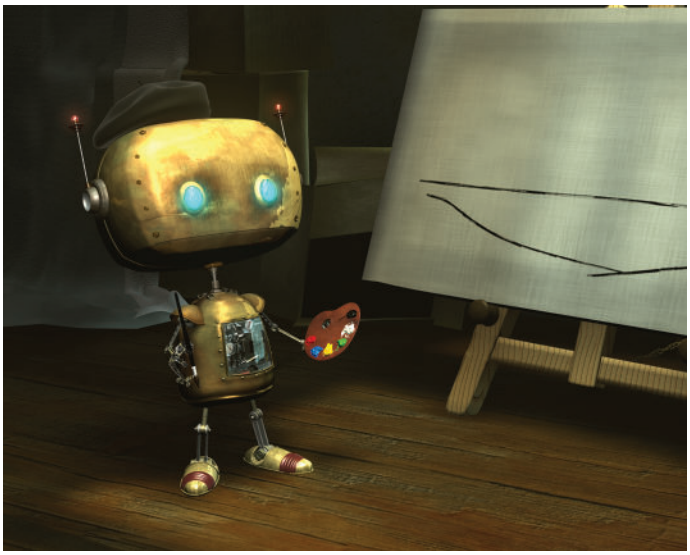
PRODUCTION
Modeling: polygons. Rendering technique used most: Maya hardware rendering and After Effects. Average CPU time for rendering per frame: 3-8 minutes. Total production time: approximately 200 days.

SOFTWARE
Modeling, animation, rendering, and dynamics: Maya 4.5. Compositing: After Effects 5.0. Additional software: Photoshop 6.0, Premiere 6.0. OS: Windows 2000.

HARDWARE. PC dual 1.6 GHz CPU, 1 GB RAM. Graphics card: G-Force 3.

The Painter

Character Animation, Length 5:09



The story of a tiny robot artist made up of spare computer parts. Stuck in a dark and gloomy room, our little hero dreams of impossible adventures turned into paintings on the walls. All that is set to change the day he summons a genie who grants him three wishes.

This four-minute film was created by 422, a UK-based, award-winning production company, in collaboration with researchers from HP Labs, Bristol, UK. The animation was rendered using a prototype rendering service developed by HP Labs, running on an HP Utility Data Center (UDC). By tapping into large amounts of compute power on-demand, 422 was able to meet the aggressive deadline without sacrificing production values.

This collaboration demonstrates how computing resources can be assembled, organized, and managed virtually using the flexibility of the UDC, a key component of the HP Adaptive Enterprise architecture. It also illustrates the value of utility computing, in which an end-user taps into a large pool of virtual resources but pays only for what is used.

Director
Andy Power

Hewlett-Packard

Associate Producers
Stephen Hinde
Rycharde Hawkes

Rendering Service
Guillaume Belrose
Sophie Bevin
Patrick Goldsack
Julio Guijarro
John Henriksson
Paul Murray
Peter Toft
Lawrence Wilcock

Producer
Anne Farrell

422 South

3D Animators
Andy Power
Tom Downes
Duncan MacDonald
Jaime Pardo
Tia Perkins
Libby Redden

Systems Manager
Dougal Matthews

Dubbing Mixer
Steve Williams

Foley
Richard Birtwisle

Music
Kim Humphrey

Post Production
David Corfield

Executive Producer
Andy Davies-Coward

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PRODUCTION
Modeling: NURBS. Rendering technique used most: Maya software renderer's raytracing. Average CPU time for rendering per frame: 22 minutes. Total production time: 2.5 months. Production highlight: This film was rendered on HP's experimental utility rendering service developed by HP Labs, Bristol, UK. Over 18,000 frames were rendered in 17 days, with the number of processors flexing from 18 to 104 to meet the variable rendering demand during that period.

SOFTWARE
Modeling, animation, rendering, and dynamics: Alias Maya 4.5. Compositing: Quantel Editbox. Custom software: HP's experimental utility rendering service was used for rendering the film. OS: Windows (various) for workstations, RedHat 8 Linux for rendering farm.

HARDWARE
PC/Intel dual 1 GHz CPU, 1 GB RAM. Rendering farm: 104 CPUs (ProLiant DL360s with dual 1.4 GHz PIII CPUs, 4 GB RAM, 72 GB HD).

Pfffirate

Animation, Length 4:00

Directors
Xavier Andre
Guillaume Herent

Producer
Supinfocom Valenciennes

Contributors
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An inflatable pirate fights against a clockwork bird that threatens its boat.

PRODUCTION
Modeling: polygons. Average CPU time for rendering per frame: 3-5 minutes. Total production time: approximately 250 days.

SOFTWARE.
Modeling, animation, and rendering: Discreet 3ds max 5.0. Compositing: Discreet Combustion 2.0. Additional software: Adobe Photoshop, Illustrator, After Effects. OS: Windows 2000 Pro Edition.

HARDWARE
PC Intel P4 2 GHz CPU, 1 GB RAM. Rendering farm: 6 CPUs.

The Pier

Animation, Length 3:05

Director
Jason Bennett

Producer
Ringling School of Art and Design

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A fisherman ventures onto a lonely pier for some quick fishing before nightfall. As he walks the length of the pier, a strange creature follows from below. Descending the piles to the sea below, the beast reveals that she has something in store for the fisherman, but is she friend or foe?

I chose to experiment with a number of things in this short, from Maya's ocean shader to an upside-down quadruped. Created in Maya 5, Photoshop 7, Shake, and DeepPaint 3D.

PRODUCTION
Modeling: polygons. Rendering technique used most: Maya's software renderer with light domes for faking global illumination. Average CPU time for rendering per frame: 10 minutes. Total production time: approximately seven months. Production highlight: Maya's ocean shader used for ocean simulation.

SOFTWARE
Modeling, animation, dynamics, and rendering: Maya 5.0. Additional software: Shake 2.5, Adobe Premiere 6.0/6.5. OS: Windows 2000/XP.

HARDWARE
PC/Intel dual 2.6 GHz CPU, 1.5 GB RAM. Rendering farm: approximately 150 CPUs. Graphics card: Quadro FX 2000.

The Presentators "Cake"

Broadcast & Commercials, Length 1:00

This is an episode from the second series commissioned by Nickelodeon UK. It features Dan as The Great Taste-O, a sort of superhero who, even when blindfolded, can decipher the ingredients of any cake.

Director
Stefan Marjoram

Animation
Stefan Marjoram
Dan Lane
Steve Blake

Writers
Stefan Marjoram
Dan Lane
Wee Brian

Voices and Music
Stefan Marjoram
Dan Lane
Wee Brian

Producer
Helen Brunsdon

Sound
James Mather
Joseph Stracey

Contact
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PRODUCTION
Modeling: Pulling NURBS spheres. Rendering technique used most: Maya renderer. Average CPU time for rendering per frame: 45 seconds. Total production time:12 days per episode. Production highlight: As with the original short film, we continue to animate a character each even though they're all present in the same scene. The animation is regularly composited throughout the process so that we can work off each others' performances.

SOFTWARE
Modeling, animation, and rendering: Maya Unlimited 4. Compositing: Adobe After Effects. OS: Windows 2000.

HARDWARE
Intel 2.2 GHz CPU, 1 GB RAM.

Quelqu'un d'autre

Animation, Length 6:05

Director
F. Bosz
J.C. Kerninon
B. Masse
B. Van Opstal

Producer
Supinfocom Valenciennes

Contributors
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An old caretaker, a little mad, is experimenting with the objects in her surroundings that upset her.

PRODUCTION
Modeling: polygons. Rendering technique used most: Mental Ray and final gathering, no HDRI. Some sets were rendered in bigger size and camera mapped to earn time in heavy sequences. Average CPU time for rendering per frame: approximately 15 minutes, some up to 30 minutes. Total production time: one year, plus approximately three months preproduction. Production highlight: There were four directors on the movie. We wrote the story and the storyboard together. Everybody did some modeling on the set, but then everybody did what he does best. Three guys were on the animation, character modeling, and skinning, and one guy was on the rendering and lighting. Maya scripts were written to make some set animation better.

SOFTWARE
Modeling, animation, and dynamics: Maya 4.5. Rendering: Maya 4.5, Mental Ray 1.5 beta. Compositing: Digital Fusion, Adobe After Effects 5. Additional software: Edit, Sound Forge 4, Premiere 6, Photoshop 6. OS: Windows 2000.

HARDWARE
PC/Intel 3 GHz (single) and 1.5 GHz (dual) CPU, 1 GB RAM. Rendering farm: 10 CPUs. Graphics card: Geforce 3.

Riba

Animation, Length 6:07

A cat dreams of being a pianist until the day he makes it, thanks to a strange friend of his.

Directors
Yves Dalbiez
Elise Garcette
Laurent Leleu

Producer
Supinfocom Valenciennes

Contributors
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PRODUCTION
Modeling: polygons. Rendering technique used most: Multiple simple rendering layers with Maya renderer. Average CPU time for rendering per frame: eight minutes. Total production time: 10 months. Production highlight: Rendering was our principal technical concern in this film, so we used the "Tomcartoonshader" experimental shader by Patrick Jean. Rendering issues were solved only one month and a half before the deadline, and fine work between traditional technique (a lot of painting) and new techniques for the contour line was essential. The render is a multilayer-pass compositing, and only for the layer black contour lines.

SOFTWARE
Modeling, animation, rendering, and dynamics: Maya 4.5. Compositing: Adobe Photoshop 6.0, Adobe After Effects 5.5. OS: Windows 2000.

HARDWARE
Three machines with single 2 GHz CPU, 1 GB RAM.

RockFish

Animation. Short version; 3:12, shown in Electronic Theater.
Full version; 8:00, shown in Animation Theater.

"RockFish" is a comic-book-influenced, high-adventure tale set on a barren planet in a distant corner of the galaxy. Sirius Kirk is a no-nonsense working man tasked with rounding up creatures that "swim" through rocks far below the planet's surface and plague the miners who live and work there. The story starts out as just another day on the job for Kirk but quickly turns into a titanic struggle with the catch of his life.

PRODUCTION
Modeling: polygons. Used motion capture as a base and blended keyframe animation on top to modify and enhance the performance. Used only keyframe animation on the non-human characters and a mix of keyframe and dynamics simulations for mechanical and FX animation. Rendering technique used most: All background plates were rendered and lit separately with a simple five-points lighting rig. Characters and vehicles were rendered and lit with one main keylight on top of a Brazil skylight. Average CPU time for rendering per frame: 35-90 minutes, depending on shot complexity. Total production time: approximately 800 person-days, spread out over several months. Production highlight: Employees of Blur Studio were asked to submit their ideas for an all-CG animated short, and the studio then voted on the entries. In a collaborative effort with Blur Studio, the winner got the chance to create a short funded by Blur Studio. Because everyone was so passionate about this project, we were able to complete the 800-day production in actually 500 calendar days! Rendered at 2K spatial resolution.

SOFTWARE
Modeling and animation: 3d studio max 5.1. Rendering: Brazil 1.02. Dynamics: ClothFX 1.0. Compositing: Digital Fusion 4. Additional software: Adobe Photoshop 7, Adobe Premiere 6, Iridas Framecycler Professional 2.7. Custom software: A lot of custom scripts, to help scene assembly and render stages, most freely available on the Blur beta site (www.blur.com/blurbeta/). Also developped our own network render manager. OS: Windows 2000.

HARDWARE
Workstations: IBM Intellistation with dual Intel Xeon 2.8-3.06 GHz CPUs, 2 GB RAM. Rendering farm: 300+ CPUs, Angstrom dual AMD Athlon 2600, 2 GB RAM. Graphics card: NVIDIA 900 XGL and 980 XGL.

Director
Tim Miller

Writer
Tim Miller

Story
Tim Miller
Jeremy Cook
Paul Taylor
Chuck Wojtkiewicz

Visual Effects Supervisor
Jeremy Cook

Art Director
Jeremy Cook

Animation Supervisors
Jeff Weisend
Tim Miller

Storyboards and Concept Art
Chuck Wojtkiewicz
Sean McNally

Layout Animator
David Nibbelin

Animators
David Nibbelin
Luc Degardin
Jean Dominique Fievet
Makoto Koyama
Davy Sabbe
August Wartenberg
Remi McGill
Jeff Wilson
Jeff Weisend
Wim Bien
Onur Yeldan
George Schermer
Jeff Fowler
Jason Taylor
Derron Ross
Cemre Ozkurt

Modelers
Heikki Anttila
Irfan Celik
Jeremy Cook
Jerome Denjean
Kevin Margo

Finishing and Lighting
Jerome Denjean
Heikki Anttila
Kevin Margo
Jeremy Cook
David Stinnett
Dave Wilson
Sebastoen Chort

Producer
Sherry Wallace

Visual Effects
Daniel Perez Ferreira
Seung Jae Lee
Kirby Miller
Sung-Wook Su

Rigging and Cloth Simulation
Paul Hormis

Animation Technical Director
Jon Jordan

Motion Capture Supervisors
John Bunt
Jeff Weisend

Title Design
Jennifer Miller
Wonhee Lee

Motion Capture Actor
James Silverman

Production Coordinator
Debbie Yu

Production Assistant
Amanda Powell

Programming and Systems Administration
Duane Powell
Dave Humpherys
Daemeon Nicolaou
Matt Newell
Barry Robison

Music
Rob Cairns

Sound Design and Recording
Gary Zacuto
Richard Gray
Pete Kneser

Film Recorder
Title House Digital

Film Processing
Fotokem

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Ruby: The DoubleCross

Real-Time Graphics, Length 1:40

Director
Harry Dorrington

Producer
ATI and Rhinofx

ATI Team

Lead Programmer
David Gosselin

Lead Artist
Eli Turner

Programming/Shader Programming
Alex Vlachos
Christopher Oat
Jason L. Mitchell
Natasha Tatarchuk
Pedro Sander
Thorsten Scheuermann

Additional Engine Programming
Chris Brennan
John Isidoro

Production
Callan McInally
Stephen Smith

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Through motion-captured animation, depth of field, realistic image-based lighting and dynamic shadows, “The DoubleCross” borrows heavily from both gaming and movie genres to create a compelling demo that further raises the expectations for real-time graphics.

In making “The DoubleCross,” the real-time expertise of ATI’s demo team was combined with the creative and artistic talents of RhinoFx to create characters, environments, and a story that was visually and emotionally appealing while demonstrating the real-time programmable graphics capabilities of ATI’s latest hardware.

“The DoubleCross” introduces the near-future world of ATI’s Ruby and her arch enemy Optico. In an action-packed minute and 40 seconds, Ruby has to outwit the cunning Optico as he attempts to cheat on an exchange. Ruby has to use her wits and battle Optico’s Ninja henchmen. In an explosive ending, Ruby escapes, leaving Optico vowing revenge.

PRODUCTION
Modeling: polygons. Motion capture blended with keyframe animation. Rendering technique used most: real-time rendering using ATI's in-house demo engine. Average CPU time for rendering per frame: average of 40 frames per second. Total production time: approximately 300 days. Production highlight: New real-time techniques for rendering hair, skin, and depth of field were developed for this demo.

SOFTWARE
Modeling and animation: Maya 5.01. Rendering: ATI Sushi Demo Engine 2.0. Additional software: Motion Building (mocap), ATI’s Normal Mapper. Custom software: workflow and asset management software, Sushi Demo Engine, Maya plug-ins, RenderMonkey, Normal Mapper tools. OS: Linux Redhat 9 (for Maya), Windows XP (for Runtime).

HARDWARE
PC 3 GHz CPU, 512 MB RAM. Hardware rendering was used for final renders. Graphics card: ATI RADEON X800 and ATI Fire GL.

RHINOFX TEAM

Senior Executive Producer/Partner
Rick Waggonheim

Senior Executive Producer
Camille Geier

Senior Producer
Karen Bianca

Story & Concepts
Harry Dorrington
David Zung

Storyboarding/Visualization
David Zung
Ji Yoon

Lead Animator
Jeff Guerrero

Technical Consultant & Animation
David Barosin

Animator/Modeler
Dan Vislocky

Lead Lighter & Project Lead
Joe Burrascano

Texture Artist/Lighter
Chimin Yang
Ido Kalir

Lighter
Natalia Senko

Shader/Texture Artist
Dylan Maxwell

Texture Artist
Martin Boksar

Modelers
Paul Liaw
John Velazquez
Shin Kull

3D Artist
Michael Ware

Shader/Texture Artist
Dylan Maxwell

Technical Animation/Dynamics
Ji Yoon

Technical Director
Jesse Clemens

Compositor/Graphics
Guy Atzman

Editor/Compositor
Marc Steinberg

Software Development
Jim Callahan

Systems Engineer
Paul Tsung

Photoshop Artists/Graphics
Chris Green

Motion Capture Production Manager
Kristen Ames

Motion Capture Company
Perspective Studios

Motion Capture Stunt Actors
Declan Mulvey
Andre "Chyna" McCoy
Casey Eastlick

Fight Coordinator
Declan Mulvey

Voice and Stunt
Wendy Litwack Casting

Voice Talent
Marlyne Afflack
Chris Phillips

Music House
Amber Music New York/LA

Music Producer
Kate Gibson

Music
Will Richter

Music Sound Design
Bill Chesley

Voice Record/Mix
Tonic New York

Sound Engineer
Jody Nazarro

Ryan

Animation. Short version; 7:41, shown in Electronic Theater. Full version; 13:50, shown in Animation Theater.

Director
Chris Landreth

Producers
Steve Hoban
Marcy Page
Mark Smith

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Produced by Copper Heart Entertainment in co-production with The National Film Board of Canada in association with Seneca College-Animation Arts Centre.

A gentleman panhandler. One of the pioneers of Canadian animation. Oscar nominee. Poor beggar. An artist unable to create. God observing the world. Fallen angel. Arrogant. Shy. Broken. Not destroyed.

"Ryan," directed by Chris Landreth, hovers between animation and documentary, and defies easy definition. It is based on the life of Ryan Larkin, a Canadian animator who, 30 years ago, at the National Film Board of Canada, produced some of the most influential animated films of his time. Today, Ryan lives on welfare and panhandles for spare change in downtown Montreal. How could such an artistic genius follow this path?

In "Ryan," we hear the voice of Ryan Larkin and people who have known him, but these voices speak through strange, twisted, broken, and disembodied 3D-generated characters, people whose appearances are bizarre, humourous, or disturbing. These appearances reflect Chris Landreth's personal world of "psychological realism." A world encapsulated in the words of Anais Nin: "We don't see things as they are. We see things as we are."

PRODUCTION
Modeling: NURBS, polygons, subdivision surfaces. Rendering technique used most: Maya renderer with some raytracing, no global illumination used. Average CPU time for rendering per frame: N.A. Total production time: two years. Production highlight: Ryan is an independent CG film, a coproduction between a Toronto-based film company (Copper Heart Entertainment) and the National Film Board of Canada. The studio space and equipment for this production were provided by Seneca College in Toronto, so that the best graduating students of its emerging animation program could work with experienced CG professionals to create a quality, hand-crafted CG film. This collaboration took place over an 18-month period. The professional staff consisted of the director, a CG supervisor, and a lighting/rendering/compositing specialist. The student staff consisted of four animators, one texture artist, and one character modeler. Over 20 other people volunteered on parts of the project, from creating smoke effects to modeling entire sets.

SOFTWARE
Modeling, animation, rendering, and dynamics: Alias Maya 4.0. Compositing: Discreet Combustion 2.1. Additional software: Syflex1.1 for cloth simulation. Custom software: Render distortions and wrap effects, written by Karan Singh and Patrick Coleman at the Dynamic Graphics Project, University of Toronto. OS: Windows XP/2000.

HARDWARE
Workstations: Dell Precision Intel P4 dual 1.7 GHz CPUs, 1 GB RAM. Nine of these in our studio. Rendering farm: 20 CPUs (P4 2.4 GHz, 512 MB RAM) loaned by Intel. Graphics card: NVidia Quadro 2Pro Graphics.

The Site

Animation, Length 2:58

Director
Etienne Lastennet

Producer
Vancouver Film School

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In a not-so-distant future, robots have taken over the role of construction workers on a large building site. On the ground, four-legged machines are assigned the tasks of carrying planks and assembling elements of the building. Meanwhile, flying robots transport construction materials to the site from a remote production factory.

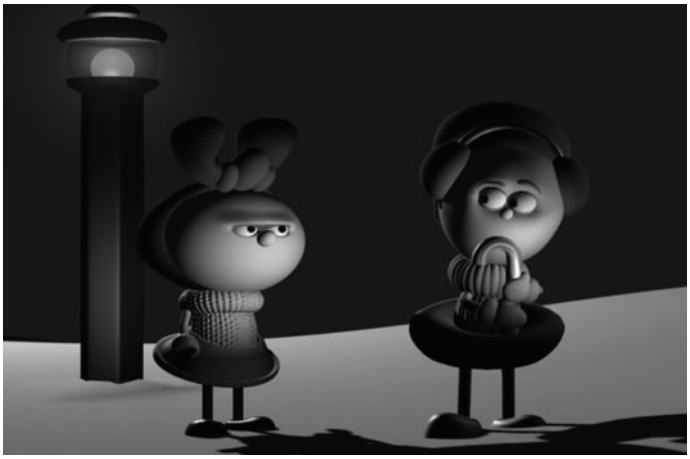
PRODUCTION
Modeling: polygons. Some rotoscoping used. Rendering technique used most: Batch rendering of multiple passes. Average rendering CPU time per frame: approximately 10 minutes Total production time: 150 days. Production highlight: Maya reference scene files provided a solution for managing large assets (models, animation, environments) individually and with more flexibility. These assets were automatically recombined when rendering master scenes. Shaders and light rigs were dynamically assigned to each render pass via MEL scripts.

SOFTWARE
Modeling, animation, and rendering: Maya 5.0. Dynamics: Maya 4.5/5.0. Compositing: After Effects 5.5, Shake 2.5, Combustion 3 (for particle effects). Additional software: Photoshop 7.0, Sound Forge 7.0. Custom software: Maya expressions to drive the motion of mechanical parts such as gears. Maya MEL scripts to handle multiple render passes without the need for separate scene files. OS: Windows 2000.

HARDWARE
PC/Intel dual 2.9 GHz CPU, 2 GB RAM. Rendering Farm: 4-12 CPUs.

Sucker

Animation, Length 3:00



Director
Ellen Brenner

Producer
Ellen Brenner

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Made at the UCLA Animation Workshop, “Sucker” follows the exploits of a candy-loving girl and a psychopath dressed in a bunny suit. The story was conceived shortly after the most asinine fight of the animator’s adult life, and while “Sucker” is based on true events, no one was actually dropped over a snowy cliff. The animated short was approached like the classic horror film “Psycho,” but it works under the premise: What if Marion Crane (Janet Leigh’s character) fought back, with Mace? “Sucker” takes place on a bleak, snowy plateau whose only point of interest is an icy lamppost that becomes the anchor for a greedy tongue and a fight to the death over a candycane.

PRODUCTION
Modeling: NURBS and polygons. Rendering technique used most: Maya renderer. Average CPU time for rendering per frame: approximately two minutes. Total production time: 240 days.

SOFTWARE
Modeling, animation, and rendering: Maya 4.5. Compositing: After Effects 5.5, Premiere 6.5. Additional software: Photoshop 7, Sound Edit 16. OS: Windows 2000 and OS X.

HARDWARE
PC and Mac, both dual CPU, 1 GB RAM. Graphics card: Fire GL2.

Tetra Pak: Forests

Broadcast & Commercials, Length 0:90

This 60-second spot opens with a germinating shoot breaking through the tarmac of a London street. Saplings and larger trees are then shown sprouting and growing in various locations around the city. Trees appear inside glass office buildings, lining the streets in Oxford Circus, shooting from an underground platform, growing under the Centre Point tower, some complete with roots dangling beneath a nearby bridge. The Moving Picture Company also created a CG forest in front of Battersea Power Station. The three main tree references were the Norwegian Spruce, the Scott's Pine, and the Silver Birch.

MPC's 3D department produced 25 shots over a six-to-eight-week period. The team created models of each of type of tree and then used BioNatics, software designed specifically to simulate the movement of growing trees. They also developed existing proprietary technology to simulate the wind moving through the leaves and branches. This model reconstructs the dynamic effects of factors such as turbulence and wind on a body to give a natural look. As part of the process of compositing the CG trees into shots, digital matte painting techniques were used, for example, to add cracks in the pavement around the trunks.

Director
Frederic Planchon

Agency
Abbott Mead Vickers

Agency Producer
Yvonne Chalkley

Production Company
Academy

Production Company Producer
Mark Whittow-Williams

DoP
Patrick Duroux

Editor
Paul Watts, The Quarry

Post-Production Company
The Moving Picture Company

Post Producer
Graham Bird

Lead Inferno
Christophe Allender
Alex Lovejoy

Inferno Artists
Nigel Mortimer
Ziggy Zigouras

Combustion
Darren Christie

Creative Head of 3D
Jim Radford

3D Supervisor
Lee Danskin

3D Animators
Greg Massie
Simon Thomas
Stephen Jolley
Glen Swetez
Alp Boysan
Jamie Fernandez
Vicky Osborn
Joel Bodin
Kevin Modeste

Matte Painter
Kim Taylor

Telecine
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Contact
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PRODUCTION
Modeling: polygons. Rendering technique used most: Mental Ray with Final Gather. Average CPU time for rendering per frame: 40 minutes. Total production time: eight weeks. Production highlight: Use of proprietary "Cantilever" to add natural dynamic movement to the trees, right down to individual leaves.

SOFTWARE
Modeling, animation, and dynamics: Maya 5. Rendering: Mental Ray. Compositing: Inferno. Combustion. Additional software: BioNatics tree simulation software. Custom software: Numerous Maya plug-ins. OS: Linux.

HARDWARE
PC /Intel dual 1.7-2.6 GHz CPU, 2 GB RAM. Rendering farm: 100 CPUs.

Tippett Studio Muscle System and Skin Solver "Hellboy"

Feature Film, Length 2:27

Director
Guillermo del Toro

Producers
Lawrence Gordon
Lloyd Levin
Mike Richardson

Production Visual Effects Producer
Edward Irastorza

Visual Effects Supervisor
Blair Clark

Visual Effects Producer
Alexandra de Souza

Contact
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Tippett Studio visual effects supervisor Blair Clark rejoins director Guillermo del Toro in creating the creatures and environments for the Revolution Studios movie, "Hellboy." Clark and his team contributed five CG characters in 15 sequences comprising 132 shots, in numerous day-and-night and wet-and-dry environments. Using hand-key-framed animation, the entire work exhibits a step forward in seamless visual effects. To add another level of photo realism, and to fully realize the fantastic characters of "Hellboy," Tippett Studio utilized a new, proprietary "muscle system and skin solver" developed by CG supervisor William Todd Stinson and character set-up lead Paul G. Thuriot. The muscle system stretches, contracts, and even adds tension, all to maintain a consistent volume of underlying anatomical geometry. On top of this, the skin stretches and slides in response to the motion of the character's internal structure.

PRODUCTION
Modeling: surfacing and standard polygonal modeling for primary rendering surfaces; proprietary techniques based on naturalistic anatomy for internal muscle surfaces. Some 2D rotoscoping used. Rendering technique used most: RenderMan. Average rendering CPU time per frame: varied. Total production time: approximately 15 months. Production highlight: Developed a proprietary muscle system and skin solver.

SOFTWARE
Modeling, animation, and dynamics: Maya. Rendering: RenderMan. Compositing: Shake. Custom software: custom plug-ins. The muscle system, a Maya plug-in, creates muscle surfaces that expand and contract while deforming to preserve the initial volume. The skin system, a Maya plug-in, builds a renderable surface that is deformed in response to the motion of the character's internal anatomy. As the puppet moves (which, in turn, affects the intermediate layers), the skin stretches and slides over these underlying surfaces. Also custom PrMan shaders, and RIB and RIB Archive generation tools. OS: various.

HARDWARE
PC, Apple, SGI single CPU, average 2 GB RAM. Rendering Farm: CPU numbers N.A. Graphics card: NVIDIA.

Visual Effects Art Director
Joel Friesch

Animation Supervisor
Todd Labonte

CG Supervisor
William Todd Stinson

VFX Production Manager
Tim de Pala

Animators
Simon Allen
Jason Armstrong
Dovi Anderson
Michael Brunet
Chuck Duke
Will Elder-Groebe
Aaron "Giggleman" Gilman
Traci Horie
Eric Ingerson
Julie Jaros
Michael Kitchen
Brian Mendenhall
Morgan Ratsoy

Lead Lighters
Kirsten Drummond
Steve Redding

Lighters
Jim Aupperle
Aharon Bourland
Conrad Chu
Jeff A. Johnson
Kevin McGowan
Charles Rose
Julien Schreyer
Bart Trickel
Davy Wentworth

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Jim McVay

Compositors
Dan Cayer
Chris Gibbons
Aruna Inversin
Matt Jacobs
Zoe Peck-Eyler
Gerard Benjamin Pierre
Matthew Wallin

Lead FX Animator
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FX Animators
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Clear Menser
Ralph Sevazlian

Junior FX Animators
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Ariel Tal

Lead Character Set-Up
Paul G. Thuriot

Character Set-Up
Joe Harkins
Peter Newsome

Lead CG Painters
Laura Hainke
Raine Reen

CG Painters
Renee Binkowski
Ruth Caspary
Edward Quintero
Sara Simon

Lead CG Modeler
Sven Jensen

CG Modelers
Dylan Gottlieb
Ease Owyeung
Jeff Unay
Robert Vignone

Lead Match-Move
Kirk Larkins
Christopher Paizis

Match-Move
Devin Breese
Tyler Ham
Dong Yon Kang
Stephen Moros
David Petry

Lead Roto/Paint
Rick Markle

Roto/Paint
Misty Segura Barbour
Shelley Campbell
Lucinda Chee
Robert Dorris
Ramona Martinez

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Naomi Ruth Raine

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Sarah Schubart

VFX Editorial Assistants
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Digital Imaging Supervisor
Matthew Tomlinson

Film I/O Supervisor
Nathan Abbot

Digital Film I/O Manager
Vicki Wong

Digital Color Corrector
Adam Gerardin

Production Programmer
Russell Darling

Systems Support
Neal Hoover
M. Stevens

Data Wrangler
Deborah Thomas

Executive Producers
Jules Roman
Alonzo Ruvalcaba

Tippett Studio Creates Machine City in "The Matrix: Revolutions"

Feature Film, Length 3:30

Directors
Larry Wachowski
Andy Wachowski

Producers
Joel Silver
Grant Hill

Eon Visual Effects Supervisors
John Gaeta
John Des Jardin

TIPPETT STUDIO STAFF
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Guided by Tippett Studio senior visual effects supervisor, Craig Hayes, Tippett Studio created the Machine City sequence by building not only a vast, living, breathing cityscape environment, but also its varied menagerie of machine inhabitants. The city, envisioned as a living fractal reef, was twice the size of the Los Angeles basin and alive in every aspect: building itself on the fly, populated with massive swarms of denizens, pulsing with lighting, electrostatic events and atmospherics. Even the massive towers appear sentient in their slow purposeful movements as they track events within the city.

City architecture was laid out both procedurally and by hand, using the building blocks of a component model library to construct organically rich and diverse crustacean-like buildings, all upon the scorched and fractured terrain typical of the Matrix's real world. Roiling clouds, lightning, electrostatics, ground pollution, and bioluminescence are a few of the 3D environmental elements stretching back 50 miles to the horizon. Dozens of species of denizens were created to inhabit this city, from the very petite to the imposing Machine God, modeled on the Wachowski Brothers' baby nephew. Each of the 140-plus shots contains at least 25 elements; many contain more than 125.

PRODUCTION
Modeling: Maya NURBS and polygons to model city component libraries, based upon concept drawings from Geoff Darrow. Some 2D rotoscoping used. Rendering technique used most: RenderMan, with extensive use of DelayedReadArchives. This allowed us to easily swap which of several different resolutions of models to actually use at render time. Average rendering CPU time per frame: 6-10 hours. Total production time: 18 months. Production highlight: This completely CG photo-real sequence, with little live-action photography, required building a massive living city. Component libraries of building pieces were built in such a fashion they could be used both procedurally or with hand dressing to create a densely layered cityscape that could be shaded either realistically or in a highly stylized manner (as in "neovision").

SOFTWARE
Modeling, animation, and dynamics: Maya. Rendering: RenderMan. Compositing: Shake. Custom software: Custom plug-ins, custom Prman shaders, RIB and RIB Archive generation tools. OS: Various.

HARDWARE
PC, Apple, SGI single CPU, average 2 GB RAM. Rendering Farm: CPU numbers N.A. Graphics card: NVIDIA.

CG Supervisor
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Visual Effects Supervisor
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Art Director
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Animation Supervisor
Simon Allen

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Les G. Jones

Visual Effects Editorial
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Thomas Schelesny

Animators
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Chuck Duke
Aaron Gilman
Traci Horie
Eric Ingerson
Julie Jaros
Daniel Loeb
Guido Muzzarelli
Jason Shulman

FX Animation Leads
Demetrius Leal
Daniel Rolinek

FX Animators
Eyal Erez
Christopher Lyman Hamilton
Michael Johnson
Clear Menser
Naz Shams
Melissa Tseng
Bryan Whitaker

Lighting Leads
Lloyd Royal Bernberg
Charles Rose

Lighting Technical Directors
Mark Andrew De La Garza
Steven Demers
Brad Fox
Steven Quiñones-Colon
Julien Schreyer
Bart Trickel
Jim Valladao
Kelly Walsh
Matthew Welker
Davy Wentworth
Nelson Andrew White

Compositing Leads
Alan Boucek
Matt Jacobs

Digital Compositors
Dan Cayer
Brennan Doyle
Page Frakes
Chris Gibbons
Aruna Inversin
Jeff A. Johnson
Zoe Peck-Eyler
Gerard Benjamin Pierre
Ari Rubenstein
Josh Saeta
Matthew Wallin

Matte Painter
Kent Matheson

Layout Lead
Christopher Paizis

Layout
Stephen Moros
Mark Siew

Model Lead
Joseph Hamdorf

Model
Jon Childress Farmer
John Koester
Paul Zinnes

Paint Leads
Aaron "Pandacat" Florez
Andy Harbeck

Paint
Nathan Stinus Fredenburg
Haskell Friedman

Puppet Lead
Matthew Muntean

Puppet
Peter Newsome
Tracey Roberts

Matchmove
Devin Breese
Kirk Larkins
Eric Marko

Rotoscope
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Rick Markle
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Misty Segura Barbour
Kenneth Voss

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Naomi Ruth Raine

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Doug Epps
Michael Mortimer

Head of Operations
Dan McNamara

Director of Systems
Christian Rice

Studio Controller
Suzanne Yoshi

Head of Production
Alonzo Ruvalcaba

Executive Producer
Jules Roman

Voice of Whale

Experimental Animation, Length 2:24

Director
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Producer
Heebok Lee

Contributors
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Vox Balaenae (Voice of Whale) is music by the American experimental composer George Crumb. His notation method is unconventional; it's very fluid and artistic. This piece is an abstract visualization of his music and carries his idea into animation. The music notes fly underwater and come from a giant shell with a texture of notes.

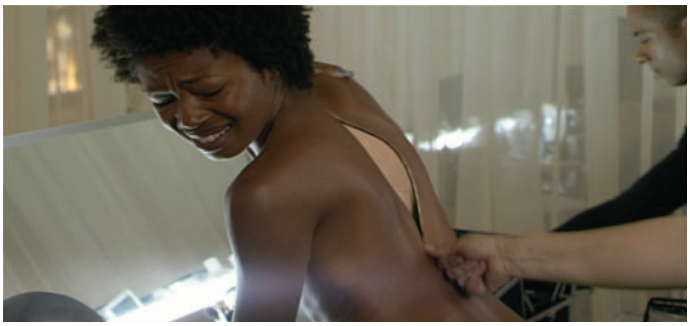
PRODUCTION
Modeling: hyper-NURBS. Rendering technique used most: NA. Average CPU time for rendering per frame: NA. Total production time: 90 days. Production highlight: Cinema 4D integrates well with After Effects; most 3D elements were rendered in black and white to save rendering time and colored in After Effects.

SOFTWARE
Modeling: Maxon Cinema 4D 8.1 Animation: Adobe After Effects 5.5. Rendering: Dynamics: Compositing: Adobe After Effects 5.5. Additional software: Adobe Photoshop 7, Illustrator 10. OS: Mac OS 10.2.

HARDWARE
Apple Mac G4 dual 800 MHz CPU, 1.25 GB RAM.

Xelibri: "Beauty for Sale"

Broadcast & Commercials, Length 0:60



Director
David Fincher

Visual Effects Supervisor
Eric Barba

Visual Effects Producer
Michael Pardee

CG Supervisor
Karl Denham

Flame Artist
Patrick Ferguson

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Beauty isn't what you think. That's the theme behind David Fincher's "Beauty For Sale." Supermodels are actually fat people underneath. To create this gag, Digital Domain created CG fat bags and pulled off the illusion of fat people underneath the skin of various runway models during a fashion shoot. This was done by compositing several passes using different actors who made up the same person. Digital Domain was able to seamlessly blend the elements to pull off the sensation that a model would actually be a fat person wearing a suit. In one instance, a model walks across the room. The upper body is a man. The lower is a model woman with long legs. The two were integrated with motion-control passes using two different actors. We matched up the movement of the two and composited the upper body of the one to the lower body of the other. In other scenes, Digital Domain created CG skin to create the illusion that the model's skin was being unzipped. As this is happening, computer-generated "fat" oozes out of her body suit.

PRODUCTION
Modeling: ultimately subdivision surfaces, human models scanned on set and cleaned up with Cyslice. Lightwave's modeler used to create the camera orbs and other hard surface models and for additional cleanup and alteration on a few shots. Rotoscoping: The animations of the various body parts were all roto-mated over the live-action plates in Maya or Lightwave. Rendering technique used most: Mostly Lightwave with DD's proprietary Lightwench plug-in to create accurate lighting models for each set. HDR domes were shot on set to drive the lighting rigs and for reflections. For all of the runway shots with camera orbs in them, a virtual HDR set was created to ensure accurate reflection positions that are not possible with a dome. Average CPU time for rendering per frame: varied greatly per object and scene. Shots were rendered as separate elements for additional compositing control. Total production time: 12 weeks (for visual effects).

SOFTWARE
Modeling: Lightwave 7.5, Maya 5.1, Syslice 2.01. Animation: Lightwave 7.5, Maya 5.1. Rendering: Lightwave 7.5. Dynamics: Maya 5.1, Syflex 2.01 Compositing: Nuke 4.0. Additional software: Track Photoshop HDR Shop Custom software: DD proprietary tracking software, DD Maya-to-Lightwave pipeline plug-ins. OS: Windows 2000.

HARDWARE
2 GHz CPU, 2 GB RAM. Rendering farm: 500 CPUs.

You

Broadcast & Commercials, Length 0:60

In "You," the camera zooms through the streets. 3D panels represent different vivid images and perceptions of an image that individuals may capture with digital cameras.

Method worked in close collaboration with Francois Vogel of Tool while the spot was being shot in Barcelona. Francois Vogel has an extensive design background and worked very closely with Method's Andrew Eksner, visual effects artist, to come up with the general layout of each vignette. Upon arriving at the desired look, Method's Cedric Nicolas took each vignette into a more 3D realm by lighting each panel separately. to give it more depth and distinguish it from the overall framing.

Director
Francois Vogel

Visual Effects Company
Method

Visual Effects Supervisor and Artist
Andrew Eksner
Cedric Nicolas

Visual Effects Artist
Jean-Luc Azzis

Visual Effects Shoot Supervision
Andrew Eksner

Visual Effects Executive Producer
Neysa Horsburgh

Visual Effects Producer
Rachel Koch

Director of Photography
Adam Kimmel-Tool

Agency
Goodby, Silverstein & Partners

Creative Director
Rich Silverstein
Steve Simpson

Art Director
John Norman

Copywriter
Mike McCommon

Agency Producer
Josh Reynolds

Production Company
Tool

Live Action Producer
Caroline Pham

Editorial Company
Lost Planet

Editor
Hank Corwin

Telecine Company
Company 3

Colorist
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PRODUCTION
No modeling required. Minimal 2D rotoscoping used. Rendering technique used most: compositing with Inferno. Average CPU time for rendering per frame: NA. Total production time: 3-4 weeks. Production highlight: Retracked the camera move in 3D space of Inferno and used the Inferno projection to re-project the shot on itself to create a visual illusion and play with perception.

SOFTWARE
Animation, rendering, and compositing: Discreet Inferno. Additional software: After Effects, BouJou. OS: Irix 6.5

HARDWARE
SGI Dual 700 MHz CPU, 3 GB RAM.

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