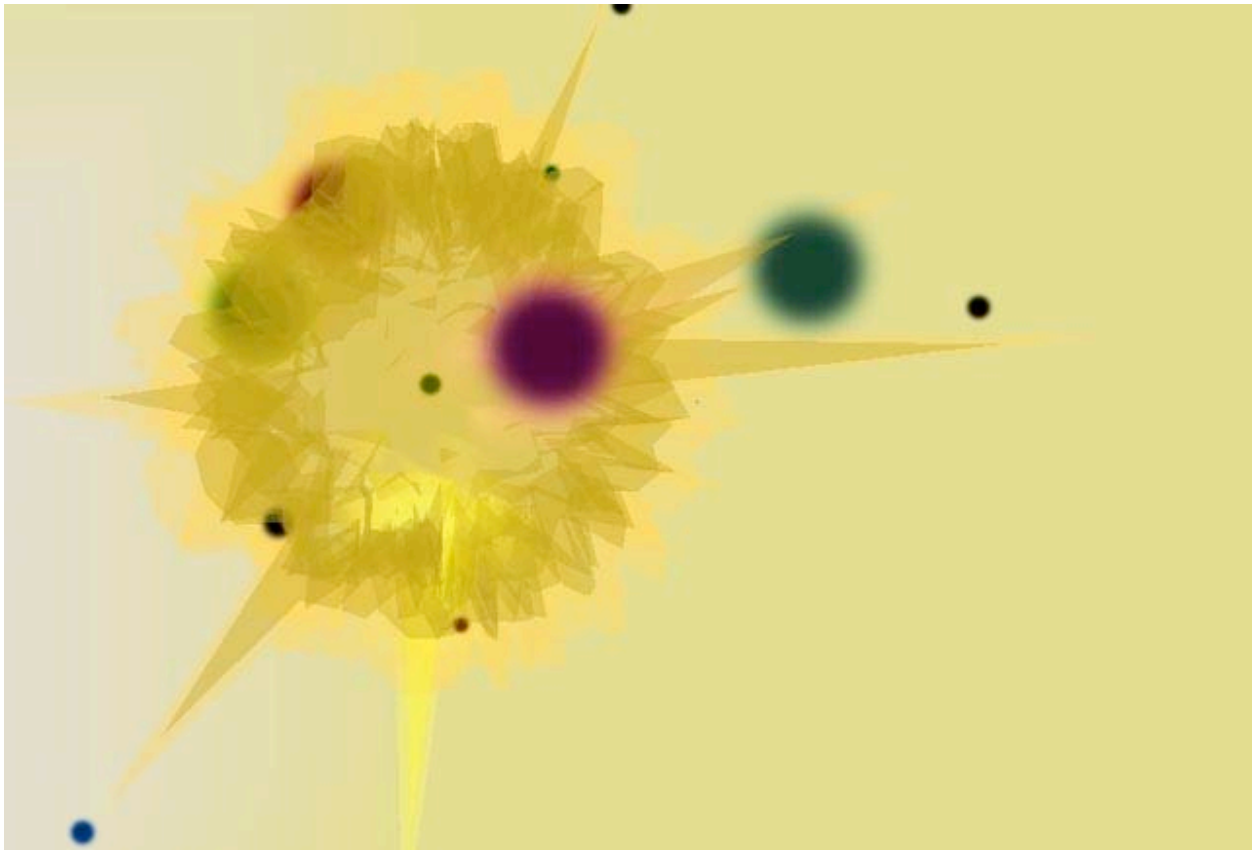

Reader: Lab3D and Web3D Art

ARTS COUNCIL ENGLAND

CORNER HOUSE

Reader: Lab3D and Web3D Art

Lab3D
Cornerhouse
17 May – 22 June 2003

Web3D Art
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INTRODUCTION

Lab3D, an exhibition and series of events and workshops at Cornerhouse, Manchester, was the effort of a team of outstanding artists, technicians, and contemporary art specialists. The realisation of the project was only possible because of the collaboration and interest of many committed partners, who were generous with resources, ideas and time. From the outset, *Lab3D* and its programme was ambitious for Cornerhouse, a contemporary arts centre. Through the continued support and encouragement of Dave Moutrey, Cornerhouse Director, resources were found and partnerships created to bring it to life. Funds from the North West Arts Board new media research initiative; Media Training Northwest's 'The Game Plan'; Visiting Arts, The British Council; the Japan Foundation, and the Arts Council of England were essential. The exhibition received collaborative support from the Media Centre Huddersfield, for the building up of a dedicated game server for Feng Mengbo's interactive work *Q4U*; and from the Digital Development Agency, Manchester City Council, who made an enormous contribution of equipment to the show, facilitating the installations. The large number of artists from the region and from abroad who participated in the education programme, and the youth workshop series, helped to create the spirit of collaboration that made this an outstanding example of joined up programming.

Web3D Art is co-ordinated with Professor Karel Dudesek, Ravensbourne College of Design and Communication, since 1998. He has committed time, energy and enthusiasm over the years to create a unique collaboration that has become legendary in the 3D community. The development of the extended on-line audience for the show at Cornerhouse was made possible through the simultaneous exhibition of the on-line exhibition in a number of venues, including: Folly Gallery, Lancaster; The Digital Studio at ICA, London; Watershed, Bristol; Media Lounge at the Media Centre, Huddersfield; Ravensbourne College of Design and Communication, Kent; the Experimental Art Foundation, Adelaide, Australia; and Centre of Contemporary Art, Skopje, Macedonia.

The research funds from North West Arts Board allowed the symposium to take place, and the documentation of the on-line discussion over the **empyre** mailing list (coincidentally founded and operated by Melinda Rackham, who is an artist in the exhibition and a regular *Web3D Art* participant). This reader is the result. It also includes an edited version of the symposium presentations, held on May 17 in Cinema 3 at Cornerhouse. The entire day's presentations were transcribed by Adam Margerison, an intern at Cornerhouse from Brisbane, Australia. The transcripts were then edited by Taylor Nuttall (Director, Folly Gallery).

The **empyre** discussion was edited by Melinda Rackham (she was unfortunately not in Manchester for the exhibition or symposium). A full transcript of the discussion is archived. Every effort has been made to keep the quality and style of the comments made by the participants, but it was necessary to create a readable record of the discussion for those who are not familiar with the topic, or discussion list protocol. For a full archive of the reader, it can be found at http://lists.cofa.unsw.edu.au/pipermail/empyre/2003-June/thread.html

The staff of the Visual Arts Team at Cornerhouse, and the specialists who supported our efforts to bring the first on-line exhibition (using wireless technology) are all to be congratulated for their fine contribution to a very new 'new media' genre. The level of trust and competence were exceptional, and deserve a special medal for achievement.

Kathy Rae Huffman, Director of Visual Art, Cornerhouse.

LAB3D SYMPOSIUM

17 May 2003

Kathy Rae Huffman:

Welcome to Cornerhouse. This is a special occasion, to present *Lab3D*, one of the first major on-line gallery exhibitions in the region, and the first to explore 3D space, and to have the artists in the exhibition here to participate in a discussion. 3D is a unique 'new media' genre, and because it demands compatible hardware and software, we present it in a controlled gallery space, to offer the conditions for optimum interaction, bandwidth, and public programmes that open up a discourse on 'new media.'

As a general introduction, and as the curator for the exhibition, I can say that I became interested in digital process and the art made with the computer in the early 1980s. I organised one of the first exhibitions, 'The Artist and the Computer' at the Long Beach Museum of Art in 1983. It was interdisciplinary, and included several artists practising in California who had been in or at the 1968 **'**Cybernetic Serendipity: The Computer and the Arts' exhibition, at the Institute of Contemporary Art, London, curated by Jasia Reichardt. I didn't feel that art work with computers was 'new media', rather just another product of investigation by artists who were working with various media tools.

Although 3D on-line is still relatively new in the general on-line community, it has a very important history. 3D on-line started with Virtual Reality, at the end of the 80's. I was curator at the ICA Boston then, and was aware of much of the research going on over at MIT and in the Media Art Lab. When the SIGGRAPH conference was held in Boston, I attended a presentation by Jaron Lanier (along with about 5000 other people), where he introduced -- for the first time -- Virtual Reality and his research concepts. It wasn't widely known in the computer world, so not at all in the art world. It was just a start for considering this new, virtual space as creative 3D connected space. It was about acknowledging that a very new universe existed within the network, not a corporeal space in gravity, but a totally free space where anyone could imagine, create and fill it with new kinds of objects and activities. A space where one could be anything or anyone they wanted to be.

The German media group Van Gogh TV, started to work in the late 1980s, and in 1992 were invited to documenta IX with their live/remote television show from the international exhibition: 'Piazza Virtuale'. This project demonstrated some of the most recent remote connections, using ISDN and commercial picturephones, with connections to Belgrade, Russia, Italy, France, Germany, Latvia, Czech Republic, Slovenia, Austria and beyond. I assisted the project as the Piazzetta Co-ordinator, and became immersed in international media activities in east and west Europe.

In 1998, Karel Dudesek and I, working together as a Van Gogh TV (VGTV) project, organised the first on-line competition for artists working in 3D, to basically find out who and what was there. We had seen a few works, and had attended the Web3D Sympoisum in California, in 1997, which was extremely stimulating. We suspected that a vast community of people were working in isolation or in institutional pockets in their own countries, so we made an international call for works. The resulting program was just amazing. The huge number of artists, scientists, and designers who responded, more than 100 from 25 countries, were doing really interesting

development work in sound, connected universes, avatar development, scientific representation, narrative and games.

Web3D Art was first shown as the official art show in Paderborn, Germany, and was called VRML Art. Tony Parisi and Mark Pesce, the co-inventors of VRML (virtual reality mark-up language) were generous and supportive, and the event brought together a number of artists, and for the first time we could see the dynamic of this community of users.

The selection of on-line work was all from artists who reacted to the call for projects. This is how I met John Klima and Patrick Keller (present at the symposium) whose work is in the current Web3D Art selection. Later editions of the competition included works by Tamiko Thiel and also squidsoup. Web3D Art was the way we all learned the extent of the landscape of 3D on-line. Since 1998, the independent efforts to maintain the competition has been recognised by the Web3D Symposium, where it has been the official art show. So many of the artists proposed installation works, and several had been shown in festivals, or technical conferences like SIGGRAPH. To bring the installation work together with the on-line selection was the goal of *Lab3D*. Web3D Art is archived at:

http://www.web3dart.org.

Anthony Rowe:

squidsoup started in 1997, it was a result of a couple of us doing an MA in interactive design, looking at what was out there at the time and thinking that there really wasn't much in terms of commercial work that was pushing the boundaries.

Altzero is an ongoing project that aims to explore the possibilities of musical composition in virtual space. Using space as an alternative (or addition) to the temporal backbone of music, a piece can become 'navigable', or 'explorable' - i.e. the listener is given a degree of control over how they hear it and what they hear.

It's about composition in space, starting with taking the temporal component of composition and 'spacialising' it, rather than having a time component you have a space component. Rather than hitting play and going straight through an audio track, you can explore it in infinite different ways. We started to look at ways of expanding on that, looking at it from an interactive standpoint, and creating navigable sound compositions.

Previous incarnations of the project have taken the form of single compositions, accessible on-line or as an installation. With altzero5, we have made a tool that enables people to create and publish their own navigable music compositions - using their own sounds, and with control over playback and various spatial parameters (location, range, visual appearance and so on).

The installation at the Cornerhouse (made with electronic musicians Icarus) consists of a sequence of ten soundscapes, created during the first two days of the *Lab3D* exhibition. A series of sound making objects were placed in the gallery, and connected to a mixing desk using contact microphones. The audience were invited to interact with the objects, and the resulting sounds were then sampled, as the raw material for Icarus' navigable music compositions. They made over 50 soundscapes in that time, each a progression from the last. It starts off with just one sound and builds up and up over the day, and by the end there will have been sounds that have come and gone. All of the sounds will have had as their starting point someone coming into the gallery, knocking on one of these instruments, or hitting them or playing

with them. The end result is both a musical composition and a unique record of that event.

Altzero 5, rather than having the visuals complement the audio they actually add to the overall meaning of it and help you understand what you're listening to. You could have a sound that you're listening to that may be made up of 50 different sounds or just a single sound that's being processed. It acts as a sort of road map, as you're steering through this space you can see each sound within the space, you can go up to it, deconstruct it and really understand what's going on there.

Altzero uses a spherical space, it is truly 3D, you've got completely free movement, the advantage of having a spherical space is that where movement tends to orbit like a planetary system is that it's like an infinite space, there's no edges on it, you don't get lost. We're not focusing on navigation for its own sake but rather navigation to explore the piece of music. For each sound you can set the range of the sound, its audible range, the distance from the centre. Because it's orbital type motion, it makes more sense to use polar type co-ordinates, you've got latitude, longitude and distance from the centre as the 3 dimensions. There's also a time line, or a loop, along the bottom so you can fade things in and fade things out; you can determine how it loops; and you can determine the visual style of the thing.

I mentioned the sound is visually represented and it is represented by a variety of different mechanisms, the main one is really a sort of pulsating blob, which pulsates with the amplitude of the sound.

The data consists of a text file and sound files, the idea is it's almost a publishing format in a way, we can create a whole bunch of other players that can play in surround sound or stereoscopic vision and so on.

http://www.altzero.com

John Klima:

I've been coding 3D since around 1978. I went to art school, studied photo mostly, but did sculptural work too. I switched to computers as my primary medium around 1990, when the first CAD programs and primitive ray-tracers surfaced. As a photographer, I was primarily concerned with still life and constructed realities, so the computer offered solutions to nagging real world problems. I no longer needed to suspend things with wires, no longer had to frantically search for the right object for my scene, I could just "make it" from scratch. The machine added an additional element that still photography and even film or video could never achieve: real-time animation and interaction.

I have participated in *Web3D Art* since its inception, first submitting work executed in WorldUp, a proprietary high performance 3D IDE. In the last few years for web work I have switched to Java, implementing with the anfy3D API and the idx3D API.

I'm nonetheless fond of the real world, so I often combine the virtual and the real with physical installation. I create parallel physical and virtual worlds, each echoing elements of the other.

In this show *Earth* is done with a high-end 3D graphics renderer and in the Web3D show Context Breeder is done with a low end renderer, Java.

First here are some installations that I've done. *Fish* is a game, you play it on an arcade cabinet, it costs 25c to play. An arcade cabinet is connected to an elaborate fish tank. A 36in diameter fish bowl, and four 24in bowls on the outside, each of these has a goldfish in it, a feeder fish, called

comets. The Chinese have been practising genetic art for thousands of years, as represented by these highly aestheticised goldfish. In the game you select your avatar, one of those goldfish, you're playing a fish in the game. You can choose to play the game in passive or aggressive mode. The whole world in the game world mirrors the physical installation, there are tubes that you swim through and a big chamber. As you enter the big chamber there's a castle. The object of the game is to get to the other side, an Oscar fish comes up and in passive mode they just say hello.

Eventually we make through to the other side and go into the dispenser and an arm drops and both fish slosh into the outer bowl! Depending on which avatar you choose to play you end up in the bowl with that avatar, the little feeder fish ends up in that bowl with the avatar you chose to play. The live fish is then deposited from the upper tank into the central bowl. In that bowl are three live Oscars, and Oscars are carnivorous fish. Personally, I don't have any ethical dilemmas with this. There are these video games with lots of violence and there's never any consequence. I wanted to put an actual life on the line, and when you play you have the choice to play in aggressive or passive mode, so you can choose to always save the fish. I found that most people did actually play in passive mode.

I made the game difficult on purpose. It's an interesting issue in new media art how do you address the hardcore gamer and the blue haired old lady at the same time? They have very different skill levels when it comes to interaction. To solve that problem I made the aggressive mode very difficult and the passive mode very easy.

The Great Game exists as a physical installation as well as a web work. During the bombing of Afghanistan, actually before the bombing, I began this piece and everyday I went to the Department of Defence website. From their press briefings I culled the information of troop movements. I wanted to find out where are the troops, where are the planes, what kind of munitions are going where? Then I'd use them to map everyday, the progression of the war. It also cost 25c to play – in the gallery installation I put it in this little helicopter kiddie ride, you can grab the joystick and navigate through the scene. What's important is it's a game you can't play; it's being played for us. Most video games you're in control of the action, you're doing the bombing, you're doing the shooting, but in this game all you can do is watch and the munitions are moving for you.

I used the colour blue to represent the UN forces and green to represent the Taliban bases. What's interesting to note here is that the actual telemetry from every one of these flights exists. The absolute co-ordinates for every one of these bombing runs actually exists, and that data isn't made available though if it was it would be very easy to represent it in an environment like this. I have no doubt that the military has visualisation tools like this and of course far more sophisticated. The title *The Great Game* comes from Kipling. During the Victorian era Queen Victoria was engaged in a similar conflict in Afghanistan with her cousin the Tsar of Russia, and it was generally referred to in the British press as *The Great Game* and that phrase was attributed to Kipling.

IDX Campaign, is the Iraqi Expansion Pack and Campaign Maker Version 1, TGG Iraqi Expansion Pack. I wanted to create a patching tool or skinning tool where you can put your own geometry in, your own imagery into the game. I wanted to do something like that again with my basic military campaign mechanism. I couldn't use blue cause that's the UN colour so I decided to use black to represent the

American munitions. Also so as to make no misunderstanding about my sentiments about this conflict. It's basically the same as the original Great Game. I wanted to make a patching tool that was easy to use, it's just a bitmap. I have a munitions palette and a map of Iraq, and I just take colour and actually paint where you want your munitions to appear on the final map, you make a new image for every day.

For all these Java versions I also have high-end graphics versions as well. It's nice to use Java because there's no plug-in for the 3D graphics component, no download, so even though it's a bit slow and clunky and not really feature rich, it is a good technology to use. It's so accessible to most computers. That's a battle that I constantly have, as an artist I don't want to have to be forced to use non-toxic kiddie paints, I want to use oil paints, I want to be able to use the best materials that I possibly can. But with computers, with the Internet quite often you're required to achieve a lowest common denominator which is quite frustrating to me. So the solution for me is often to make two versions of everything, the low res. accessible version and the high res. really beautiful version.

Go is sort of the precursor to *Earth*. *Go* consists of a physical installation, an 8ft weather balloon and these little robots that run around on a map of the earth, which is on the floor. The robots have very simple behaviour, they're attracted to light. Lights are turned on and off by an interface that you use, you manipulate satellites and turn on and off disks. The floor map is made up of individual drawing pads ten sheets deep, and each sheet is labelled 1, 5, 10, 20, 50, 100, US currency denominations. All the drawings are for sale, and once a drawing is sold it is removed from the pad. The interface that is being projected onto the globe is an image of the earth, with disks. These disks are located on various countries, and the size of the disk is determined by the strength of each country's currency against the dollar. If the currency value against the dollar is very low for that country then the disk is very small and it's hard to hit. If the currency strength is strong the disk is big and so it's easy to hit. The map on the floor ends up being this crazy graph of currency fluctuations. There's a caveat to this little game in that if you buy down to the $500 level you create a hole in the map that the robot can't climb out of. So, if a robot falls into a $500 drawing and you've reserved it, you get the robot and the drawing for $500! The game was over when all the robots were sold.

EARTH is a limited edition presented on eight multimedia objects. Stand-alone *EARTH* includes a 15" LCD monitor, a hand-crafted computer, and a trackball input device. Though making extensive use of the Internet, *EARTH* is not available as a free download, for both technical and philosophical reasons.

The *EARTH* software accurately positions real-time data culled from the Internet on a three-dimensional model of the Earth. Viewers are able to travel from layer to layer by zooming in and retrieving imagery and data for specific regions. From the outer to the inner layer, viewers encounter:

- A detailed 3D outline of the earth's coasts, based on US Geological Survey data.
- A spherical mapping of GOES-10 weather satellite imagery.
- LANDSAT-7 satellite imagery of the earth's surface.
- Topographical maps created from digital elevation data provided by the military mapping agency.
- A local view of the earth's terrain (the terrain geometry and textures are generated dynamically from raw data files available from a US

military Web site). Here, viewers can "fly" through a five-degree by
five-degree patch of the earth's terrain.

- The current local weather conditions on the terrain patch - a visual
interpretation of weather from more than 6000 weather reporting stations world-wide. Visibility is translated into density of fog, while temperature influences the colour of the fog (blue=cold; red=warm).

The entire dataset exposed is cached on the hard-drive, and if the system has a live Internet connection, the cached data is supplemented by the current on-line information.

KRH: So how did you move from Go directly into this piece?

JK: When I was a little kid I wanted to be an astronaut when I grew up. I wanted to be able to reproduce that experience of seeing the earth in real time from outer space. I've taken real-time data from a number of sources on the net that have global coverage, and then represented it through a very highly aestheticised, very stylised representation scheme. It also relates to Neil Stevenson's novel Snow Crash, where he describes a piece of software called *Earth*, which is this really amazing piece of software where you could see everything about the earth in real-time at your fingertips. There are a lot of people working on this same basic idea, the idea of a global visualisation or earth viewer, but they're all restricted by having to be accurate. They have to have a level of verisimilitude that an artist doesn't have to have. My terrains are crazy coloured and heavily exaggerated, and rather than trying to resolve the imprecision of any mapping system I actually let the seams show. Any data source that you see on CNN with these sort of zoom-ins over the Iraqi terrain are heavily groomed to make them look smooth, whereas the data has actually got many holes and many inaccuracies, many faults…

Context Breeder creates an alternative, genetics based interface for the Rhizome Artbase. Users create genes out of 4 selected art objects and then 'breed' their genes with others contained in the 'gene pool' to create offspring - new combinations of artworks. The fitness of a gene is determined by the similarities between the artworks it contains.

Lets consider what this commission is by definition - an alternate interface into the Rhizome Artbase. This means that the end result should have a function; it should actually be useful in some way. To bring Art back into the definition means that the function need not be "useful" in only a practical sense. It does not need to improve upon an existing methodology for Artbase access, because as Art, it is not a tool. Art needs only to supply the unusual methodology.

My goal, in a functional sense, was to create an organic mechanism that assembled a collection of works that relate to each other. Somehow, they were to represent examples of key concepts in net.art without the assemblage being the dogmatic choice of a single individual, or the "oppression of public opinion" in a vote system. We often see in movies such as "Minority Report," fabulous interfaces seamlessly providing precisely the information the user needs. This seems in stark contrast to the reality of the computer interfaces we actually have. The reason for this is twofold - we don't have equipment actually capable of presenting data in these fabulous ways, and we don't have the mental capacity to utilise such an interface if it did exist. My goal as far as presenting the data was to do so in an a-typical way, in a way that did not suggest any of the interface

metaphors we are accustomed to, and perhaps debilitated by.

http://www.cityarts.com/earth

http://www.rhizome.org/Context_Breeder/

Tamiko Thiel:

With VR we have the capability to visualise metaphors in a 21st century form of Surrealism that expands the dreamscape from an image into an environment. We can build extraordinarily rich, sensitive environments wherein the structure of the virtual space itself and of the user's interactions with that space, reate an intimate dramatic tension between the user and the virtual environment.

Beyond Manzanar is a metaphorical landscape that explores media scapegoating of ethnic populations in times of crisis and invokes the human spirit that creates beauty under adverse conditions. The work is a collaboration between myself a Japanese American media artist, and Zara Houshmand, an Iranian American poet and theatre director.

The historic experiences of Japanese Americans in World War II and the more contemporary experiences of Iranian Americans form the basis for a surreal and poetic work contrasting immigrant attempts to achieve the American Dream with mass media demonization of entire groups as the "face of the enemy."

Manzanar Internment Camp in Eastern California is used to focus the stories of these two diverse groups into a single dialogue. Manzanar was the first of over 10 internment camps erected to incarcerate Japanese American families during WW2 under a false charge of military necessity. In the 1980s the American courts declared this internment to have been "not justified," but the principle of mass internment of an entire ethnic group on the grounds of military necessity still stands. During the Iranian hostage crisis in 1979 – 1980 and with every subsequent fear of middle-eastern terrorism there are verbal, physical and legal attacks on Iranian Americans and calls to intern them "like we interned the Japanese."

In 1995, Zara and I were working at a company called Worlds Inc., one of the first companies to make a PC based, on-line, multi-user, virtual reality technology. We talked for a long time about how we could use this as an artistic medium to really create an interactive and dramatically complex narrative. In 1995 there was a bombing attack in Oklahoma city that was the worst attack on American soil, until our last 9/11 attack. The day after that attack, the papers were all full of 'Islamic terrorists attack in Oklahoma city'.

Zara had to go off on a pre-scheduled meditation. She knew that the site of Manzanar was nearby, and went to visit it after the retreat was over. She told me it was very strange because it looks so much like the landscape of Iran. The land is dominated by high snow covered mountains, the area is a high-desert plateau. Water trickles down from the mountains and at the bottom you have these oases where you can build villages. She said that it went beyond the pure construction of the landscape, it was very strange walking around the site – there were ten thousand people interned here. The grid of roads done in army camp style is still there in the middle of the desert. Rather than looking like a military camp, the landscape reminded her so much of Iran and this grid reminded her of the paradise gardens that they build in Iran, almost on this type of grid structure, which symbolises the cosmic perfection of paradise. As she talked about gardens in the desert, gardens in the camp, I remembered stories I'd heard as a child from some of my Japanese

relatives that the Japanese had indeed built gardens in the internment camps.

I found this photograph by Ansel Adams of the largest of the paradise gardens in Manzanar, and this book called “Farewell to Manzanar” written by a woman who’d been in the camp as an eight year old. She talked about sitting in this very garden and how she would choose her viewpoint very carefully so that she couldn’t see any guard towers, any barracks, and she would try to stay still as long as she could. As long as she didn’t move she could preserve the illusion that she was in paradise and that she was there of her own free will. That moment -- of using movement and shifting of the built environment (of the scene within the same actual space) –says you’re always in Manzanar but you’re shifting between paradise gardens and the camp. This was to me a very powerful image of what we could do in interactive virtual reality 3D, that we couldn’t do in other media.

I didn’t want to get trapped into making a documentary I wanted to be able to really play with your emotions. It’s the emotional veracity of the experience that’s important. I found out that using surrealistic devices, visualisations of metaphors are a really powerful device. I wanted the feeling that the air was full of hate, that you’re surrounded by a feeling of hate.

We had floating in the sky, fading in and out, all sorts of headlines; funny little signs that people made during WW2. All were archival materials to give you a feeling of what it felt like to be in this camp and know the sort of media hysteria that had brought you there. We also wanted to give a voice to the people, the experience of being in the camp, in the fence we’ve put poems in Farsi and Japanese with translations in English, about exile, longing, imprisonment, not being able to cross the fence.

We didn’t want to have avatars, cartoon characters running around the site. There were lots of photographs, and if you look into the windows of the barracks you can see real photographs that were taken in Manzanar that show the real people, who really lived there and under what sort of conditions they lived there. We try to lead you through the piece by opening doors at specific times and then closing them behind you. That forces you to go on and try to find a way out and through. It also tries to replicate some of the emotional experience that the internees would have had as the doors closed and pushed them forward into an uncertain future.

You go into the barracks and they are not packed full like you see in the windows, they’re empty but full of ghosts, the ghosts murmur at you, you’re trapped, you have to find another way out. We’ve given you a little hope, there’s this strange little Japanese room at the end of the room with views of the garden. When you enter that room, all of a sudden you are in paradise. But, it turns out you’re still in Manzanar; look this is the same scenery. I’ve used principles of Japanese garden design and moved the viewpoint 20 degrees so you can see out the pass, using what’s called literally ‘captured scenery’. The garden design had a foreground, middle ground and also incorporated the background, the actual scenery you’re ‘in’, so you get this view of absolute expansiveness.

We’ve also put lots of music in the piece, to give you a cultural context. Are you in an American context with American pop music? Are you in a Japanese context with Japanese music?

There’s a whole series of barracks that we call ‘the American dream’, where you start out in a Japanese context; people are sitting here eating a Japanese style banquet, and then you

wade through paperwork in the immigration corridor, in order to emerge in America. This whole time you can see through the walls, and you realise that although you're trying to be the good American, you're sitting here in an American internment camp for the crime of being Japanese.

Searching for a way out you come into this Iranian crisis room, 'the Iranian hostage crisis', as it's called in the states, 1979-80. When the Islamic revolution deposed the Shah, Islamic students held Americans hostage in the embassy in Tehran, and the headlines, the sort of invective reminded the Japanese-Americans incredibly of the sorts of invective directed against them during WW2. When you try to get out of the Iranian-American dream room, you have photographs of your happy friends and relatives who are becoming American and fitting in. But, if you go too close to the images you find out the walls are transparent, you're hovering over the internment camp and the sky is filled with images of the terrorists that people think you really are.

You can flee into a garden. As our protest against the technology --and to show that we're trying to use the technology for a different sort of message -- we have included a war scene. You start the video war by your own actions, but at that point we take away your control. You have no control of your movements, you have to wait for the war to be over and only after the war is over will you be able to take direct action in your own life.

http://mission.base.com/manzanar/

Michael Pinsky:

I thought it would be interesting to have a set a map of maps that weren't geographically based that you had to piece through, that weren't the tube map, which is a wonderful graphic and incredible bit of advertising. Like any advertising it's very false, you have no idea how long it'll take to get somewhere. I set out the task of mapping London in time by all the different modes of transport; I picked out five; walking, taking the train, bus, driving and cycling. The tube map includes not only the time on the train but also the time it takes to get down so the funny elongated bits, the spidery bits are the time it takes to get down on the escalators. After I mapped this out in time, I realised that you actually spend about ten percent of your time on the tube and ninety percent of your time walking underground. I had this fantasy that the tube goes nowhere and you walk most of the way underground. You get on this thing, it shakes about, then you get off and carry on walking! In New York you just need to look down through the road and you can see the tubes are there, but in London they're really deep so they can get away with this!

In Transit started off as a two dimensional project. Then I realised there was a problem I was struggling with. In most of the maps, when you have two fast journeys and one slow journey in the middle, you've got all this excess time to get rid of. It's like a bit of rope and I thought that I could zigzag the rope in between. All the concentrated bits are very slow routes and that's how I got rid of the excess time. That's what really got me thinking about 3D maps. Even though aesthetically I enjoy the 2D challenge of flattening these maps out.

I made video of all the routes and used that data to form the visual maps, there's five monitors all with the competing modes of transport. You start off at Marble Arch and you don't know who's going to win. It's already getting into a kind of gaming framework even though it wasn't interactive at this point. Graphics are put over the top of the videos and sped up by ten times. It's quite a frenzied nervous experience, which I think moving around London is.

The idea is it's a slow-burn game, every interactive environment needs a reward system, otherwise your experience is like a bus ride, you just go round in circles and nothing changes. The longer you spend with this piece of work the more intricate the 3D model becomes and so you become the sculptor. It becomes more beautiful the longer you stay with it and resets to zero if you walk away for a minute so you have to persevere. One side of the screen is quite accurate and beautiful and the other is quite manic and rough and they really contrast each other, like a prototype tool that's also an art piece and it plays between the two things. This was worked up at the V2 Lab For Unstable Media.

http://www.michaelpinsky.com/

Feng Mengbo:

I work as a game artist now but from '91, before I had my first computer, my work was mainly oil painting or acrylic on canvas.

In '92 I made this painting *Game Over* based on the Nintendo screen, the classic 8-bit machine. I took this game and replaced the character with the hero of the Chinese army, based on the real character from the Chinese opera which was then transferred to film. Later, at a show I did in Hong Kong, I did 42 paintings based on the operas in the same format, using the hero of the Chinese army fighting the enemies, usually the US army or something else. He uses coca cola cans as weapons!

In '93 I got my first Macintosh, What I got was a very limited system, you could not do anything really interactive, all I could do was things like slide shows. Frame by frame, I would do 20-30 layers in the frames and make just like animation. Almost everything I do is to do with video game, before that all we have is television program and cinema and that's not interactive, but then with video games it's the first time we found we can communicate with machines. I started with single images and then I had 3 by 3, and 9 by 9, then 42. There was never enough with just the still images. What I wanted to do was sequences and animation. Finally when I had enough equipment and technology, it was very natural for me to do something interactive.

Taking Mount Doom by Strategy, I first showed in England at the ICA and in Liverpool. It's on multiple screens and in the middle there is a self-running movie that's about 2 minutes long, and on the other two are a kind of interactive movie player. I took 42 movie clips from original Chinese opera, the same one I used for my earlier paintings called Taking Tiger Mountain by Strategy. You can select from the list the various characters and clips. One is a game, an interface I built myself in the style of a very old computer or machine, inside is the basic game of Doom with all the weapons and sounds and things, but I changed the background to have a sequence of animation from the movie.

In '99 I wanted to find something new and I found the latest public demo version of Quake. This work is kind of like a movie. I was playing the game many hours a day, playing on the Internet with people around the world. For this movie these are not really characters in a game but these are real people doing really strange things. At that time I was doing a lot of documentary video, so with blue screens and other technology I put myself inside the game. There is a kind of interview between me and a robot, talking together about something very strange.

Audience I find it very interesting you're still painting. I wonder about the process of moving from painting to doing slide shows, where you do paintings from digital media, then

working in purely digital media or predominantly with coding. How does that feed back into the process of how you paint? Has your approach to the painting changed as a result of this later work?

FM Oh yes, when I was seriously working as a painter in '91 I was still doing something like video games. My ideas were not stopped by the still image, what I wanted to do was something more but was limited by the technology. What I wanted to do was make something with the Sega or Nintendo companies. Maybe we could work together and do some sort of video game. Now with something like *Q4U* I really can do what I want. But I come back to painting because still images are really so different to moving media. You can never stop at the one frame, the time-line, the loop is more important, but the still image can force you to stay in one moment and this can be really powerful.

http://www.mengbo.com

empyre DISCUSSION LIST

Melinda Rackham
empyre on-line forum

"I know that I have become a traveller in a realm which will be ultimately bounded only by human imagination, a world without any of the usual limits of geography, growth, carrying capacity, density or ownership. In this magic theatre, there's no gravity, no Second Law of Thermodynamics, indeed, no laws at all beyond those imposed by computer processing speed... and given the accelerating capacity of that constraint, this universe will probably expand faster than the one I'm used to. Welcome to Virtual Reality. "
(John Perry Barlow, Being in Nothingness, 1990)

The optimism generated in the closing moments of last millennium for computer constructed three dimensional Internet space may now, half a generation later, seem naive. When the 3D web standard VRML has been pronounced dead more times than painting; when there is no ubiquitous plugg-in or browser to view work; when making work in this arena is always problematic in terms of stability and delivery; why do artists continue to be drawn to it ? What space still exists for independent artist projects when most on-line 3D Internet content has been developed under the commercial auspices of the massively multi-user games like EverQuest and Lineage?

In June 2003 **empyre** on-line forum hosted an in-depth discussion on the world of the dimensionalised Internet and the landscape of computer games with guest artists and curators from ***Lab3D*** and ***Web3D art*** 2003**.**

The incredibly lively forum discussed many 3D issues including the nature and renderings of 3D space, 3D games relation to 3D art; the creation of narratives within virtual environments; the cultural specificity of 3D art; and the aura of the 3D art object. We explored virtual environments as reactive organisms or artificial life, moving into the aesthetics of single and multi-user worlds and the specific, though not insurmountable issues of showing and funding 3D interactive networked artworks in a gallery and museum system set up to show less physically interactive art forms.

Participating *Lab3D* installation artists include John Klima (USA), Melinda Rackham (Australia), Anthony Rowe of squidsoup (UK), and Tamiko Thiel (Germany/USA). Artists from *Web3D Art2003* include Simon Biggs (UK), Steve Guynup (USA), Roya Jacoby (Germany/USA), Patrick Keller (Switzerland), Adam Nash (Australia), Ales Vaupotic & Narvika Bovcon (Slovinia), Ayoub Sarouphim (Lebanon/USA), Edward Tang &

Przemyslaw Moskal (USA), and Grégoire Zabé (France).

Curators from several partner institutions who are simultaneously showing the web3D section of *Lab3D* including Kathy Rae Huffman at Cornerhouse; Taylor Nuttall from Folly, Lancaster; and Melentie Pandilovski of the Experimental Art Foundation, Adelaide also join the discussion along with many members of the –empyre-on-line community. An overview of these vibrant debates is presented in the following sections. The full archive of the empyre forum is always available on-line at:

http://lists.cofa.unsw.edu.au/pipermail/empyre/2003-June/thread.html

→ 3D curation

3D Art - in the gallery

Kathy Rae Huffman:

Cornerhouse has hosted a number of media and new media exhibitions over the past years, most widely seen was Perry Hoberman's 'System Maintenance' in 1998, during the ISEA conference. Jenny Markatou's 'Taystee's Room' was shown in 2001, alongside the futuresonic festival. It's important to keep in mind that Cornerhouse is not a media art centre, has no permanent technical team, and has no special focus or mandate for New Media, or 3D in particular.

Lab3D is my initiative, and it follows a long interest in the connection between the real and the virtual that began in the 1980s. When I was working primarily with video and installation work, the computer came up over and over again as a point of reference. My brief for *Lab3D* was to give a wide view of artworks that are realised best in the gallery, and that are representative of artistic directions in the field internationally (as well as works that were affordable, doable in our space and realisable with our resources). As in all exhibitions, a focus and limit was necessary to observe. Works selected include

- a live data stream navigation by John Klima;
- literary/documentary/socially concerned historic work by Tamiko Thiel/Zarah Houshmand);
- identity, intervention & gaming by Feng Mengbo;
- classic 3D investigation of virtual space, multi-user and avatars by Melinda Rackham;
- a real/virtual software navigation by Michael Pinsky;
- and the crossover investigation of sound and visuals in 3D space by squidsoup & Icarus, utilising a software tool work that was commissioned by Cornerhouse.

Web3D Art 2003 is also featured in the exhibition, with 25 new projects from 13 countries, including a link to all previous years to show a context and complexity to the topic.

A lot of important collaboration locally was essential to the realisation of the show. In addition to the Media Centre, Huddersfield ‘s collaboration on the work *Q4U* by Feng Mengbo, Folly Gallery collaborated on the live, on-line performance work by Adam Nash, in the one night version of his multi-user version of *Memory Plains Returning*.

I can say –regrettably-- that as an organisation, we failed to raise significant exhibition funds to enable the show to travel and to create a long deserved catalogue. Comments from various funding agencies were mainly along the lines that they could not see the ‘reason’ to put virtual work in a physical space, and that the 'art' was not significant.

My choice of artists for the exhibition follows my long interest in 3D and virtual worlds, and as a curator my definition of the genre. *Lab3D* is by no means a definitive list, but for

me it represents exceptional works by artists who have created significant works, shown widely and respected in their field. The artists all describe a physical space for their work, and this exhibition gives us mutual reward, to fulfil the requirements for the work and present it to the public.

Roya Jakoby:

Maybe big 3D is much more of a thing for real space / gallery / museums presentation after all? The situation is comparable with other art genres where equipment and tools become increasingly expensive (read exclusive) in order to add 'value' to the final piece. I personally don't have a lot of trust in exclusivity.

Melinda Rackam:

3D art made and designed to be seen in the networked environment, takes on a new context and aura in a gallery because it commands big space for video projection. Therefore: floorspace = artistic significance and value in the real estate / funding criteria of gallery / museum system.

Melentie Pandilovski:

It is very seldom that web 3D has been included in a major museum or gallery program.

I worked on web3D projects by incorporating the work of the team of Van Gogh TV (led by Karel Dudesek) "Worlds Within", from the start into the activity of the Skopje Electronic Arts Fair. Both in 1997 and 1998 SEAfair took place in the Museum of Contemporary Arts. In both cases it was a matter of using complex platforms. In 1997 there was a workshop with the artists, and in 1998 a workshop project with the Museum professionals. Then in 1999 I co-curated with Kathy Rae Huffman a VRML exhibition and conference in the Museum of the City of Skopje, and a workshop in Ohrid in 1999.

http://seafair.scca.org.mk/99/index.htm
http://seafair.scca.org.mk/99/exibition.htm
http://seafair.scca.org.mk/99/conference.htm
http://seafair.scca.org.mk/99/workshop.htm

This show did have a poster but not a catalogue. As a curator and director I struggled between the ideas whether to have a catalogue, which would have been potentially beneficial for different groups of people (researchers, art historians, artists, students, etc.) or not to, because of: 1. Simple reasoning the entire project was something that was basically intended for the net (in fact the project was highlighting the attributes of the net), 2. The conference participants (except a few) never sent the final versions of their texts, and 3. There were not enough funds. Finally we chose the no catalogue option.

I always believed that web3D is worthwhile to be presented, that it has a significant potential, and that perhaps an educating of the public and the non-involved artists for these projects was necessary. The group of artists that are taken into consideration and are incorporated into the web3D 2003, are more or less the same people that have been involved since 1999 or earlier. This means that the pool of artists has not been widened. There are certain reasons behind this, which have to be tackled.

Kathy Rae Huffman:

I believe that everyone showing work in a gallery 'should' be paid, and in regular circumstances Cornerhouse abides by the national rate established. But, for on-line work when there are dozens of artists included in a selection, it becomes difficult. In order to extend our exhibition fees, we (institutions) need to raise the money. To do that, the work needs to be known (i.e. shown) to enable funders, other curators, and

critics to experience what the work is; they need to understand the social, theoretical and even physical impact of the work on-line; and to actually see the gallery visitor using (enjoying) the work.

What institutions do offer is infrastructure to provide the connectivity, security for equipment and computers, and assistance in the gallery to explain what's going on to the audience. Institutions publicise the work, and by their educational programmes, provide a forum for the exchange of ideas.

At Cornerhouse, we don't have a permanent technical team, so we needed to find these important folks, bring them in to help install and maintain the show, and we learned a lot from them.

Why on-line 3D in the gallery - if it is (after all) designed for being on-line! We all know that often, those who are not fully computer literate can't access this work. To create an environment for the work to be shown 'properly' - either on a computer workstation, and / or projected, and to have activities to explain the work, is of course among the goals of the contemporary art gallery. To make a political point, a curatorial statement, or simply to create a programme of events around an idea (or a technology) is another reason - often cited by artists in opposition to curatorial choices.

Special centres dedicated to New Media are starting to develop, and are important focal points for presenting works. But, like the international Media Art Centres that began in the 80s, the danger is that they will attract an audience of the initiated, create ghetto environments for media - and that they won't cross over into general broadly based art audiences. It's a hard call - you have the technical resources and a specific audience. Or, you enter a 'normal' contemporary art centre or museum, and deal with the problems of not having technical support or knowledgeable audience. What we need more of is the ability to collaborate more efficiently, to bring fascinating work to a larger and broader public. They are ready for it to be a part of the contemporary art discourse, as it is in society, today.

Taylor Nuttall:

Folly has also hit the problem of raising funds for promoting work that the arts funders may not necessarily identify with, or see the value in placing in a gallery space.

This is kind of ironic, given that much language is often used in funding guidelines about attracting new audiences and challenging conceptions about the nature of art in the gallery space.

Most organisations like Folly and the Cornerhouse find that large parts of their annual financial spend has little to do with artistic programming and I think this is behind funders' attitudes to seeing on-line works in the gallery space.

The attraction of on-line work is that it carries with it little financial overheads. Whereas a physical gallery space absorbs a good percentage of the annual Arts Council pot despite attempts to diversify and bring in alternative income streams.

Thus the logic would be for expensive gallery spaces to be primarily used to promote work that would otherwise not be seen (on-line works clearly fall outside such a definition in that they are ultimately available to a world-wide audience).

I don't subscribe to this logic, but we need to appreciate its impact.

The problem for many galleries is also that they have a broad schedule, and will ultimately only offer a very diluted experience of New Media. Festivals

and events are one way around this, but to really engage audiences we need to have a consistent programming output.

It is perhaps the job of New Media centres then to act as a wider agency and build upon partnerships. The great thing about Kathy's approach to *Lab3D* was to do just that. Involving Folly, Watershed, The Media Centre and others broadens the curatorial output and brings additional technical support into the bargain.

So what can putting work in the gallery achieve:

- It legitimises the work in an arts context with reference to other works both in the space and over a period of time;
- It ensures that access to the work is generally a good experience, with say supporting information, possibly technical support, talks / presentations / workshops surrounding the works to give an extended experience.
- It broadens the gallery visitors appreciation of what a work of art can be, who otherwise may not think of looking at on-line projects.
- Dialogue between viewers experiencing the work extends, knowledge /appreciation / level of enjoyment.
- It may inspire future development.
- It raises the potential for other finance / sponsorship to be obtained.
- And artistically a different frame of reference is obtained for the work, maybe by a change of scale or user interface etc.

3D Art - user experience

Melinda Rackam:

The issue of legitimacy is interesting. 3D work isn't legitimate because it happens in this weird on-line place, it is hard to use and you need to actually download something or play with some settings so its not a seamless experience. In the gallery it can be seamless and unproblematic so that makes it ok? Are these the expectations of audiences, curators, or funding bodies?

Do audiences want to experiment a little? Or do they have to be protected from feeling like they may not understand or may "break" something or from ever feeling uncomfortable. I think one of the many functions of art is to challenge what an audience already thinks or feels, that is to make people uncomfortable; as well as entertaining them for few seconds.

Lloyd Sharp's 3D work http://www.chickenfish.cc/nano/ was seamless and unproblematic in its presentation as it fitted into the gallery parameters of art.

Lloyd Sharp:

I exhibited digital works at a number of combined Craft / Design exhibitions. Within the 'craft' exhibition context the precision of the works and industrial side of the production fitted ok.

People reacted to them and saw them somewhat like jewellery and small ceramic works in the craft context much like those intricate design works using the various similar materials of glass, aluminium and plastics.

But, they were also intrigued by the transfer from the vague digital space to the gallery space.

Many people thought the accompanying prints of 3D works and environments / spaces exhibited with them were photographs of real objects and spaces - just like the sculptural pieces they could see and touch right there in front of them.

What is most interesting about this is the kind of 'inverse' digital immersion. The objects emanated directly from the 3D environments I was working on and were made 'real' at a human

scale. They are as exciting as each other in many different ways. I like that there is a continuum from the virtual to the real where aspects can be materialised and digitised.

This brings both clarity and opacity to some of the distinctions between the virtual and real for me.

Some of the more interesting works I have seen cross this boundary. In some by simply helping us into or out of the space by provided physical clues like smell and touch as a way to reinforce, diffuse or suspend belief - or help bypass the inadequacy of the VR headsets, 2D monitors and projections.

Tom Betts:

Just because digital art can be technically complex doesn't mean to say we should provide simplistic work to coax in the uninitiated viewer.

Viewers bring their own perspectives and knowledge to a piece and I think that there are an increasing set of viewers that find current 'digital art' unsatisfying precisely because it isn't challenging in any way.

JonCates:

While gallery exhibition has its strengths the issues of gallery space as a traditional, rehearsed, protected, privatized and cordoned-off zone of commercialized art practice and socio-economic legitimation (sic) are many [of] the tendencies to enter those zones / spaces / structures are also multiple, overlapping and seductive.

We have opportunities to imagine physical / social structures that are more fitting. We have previous examples of artists who have sought out and / or crafted alternative structures.

We have examples of the now historical attempts by legitimating / institutional bodies to retrench while retrofitting and reclaiming any (often technologically and or conceptually based [unfixed / difficult / dissident / fluid]) media.

I'm always encouraged / inspired by attempts to challenge, surprise and intrigue audiences / attendees / participants with experiments, experiences and contexts that are personal, unpredictable and non-traditional.

These attitudes / activities play out in very contradictory / complex ways. I personally find that technologically based work that requires slow / meditative viewing, can be more rewarding in more intimate settings and that event-based activities that are designed with a prevalent social component can work very well in gallery spaces.

In terms of personal spaces, intimacies and histories, Ralph Hocking, of the Experimental Television Center (http://experimentaltvcenter.org/), has expressed that the best conditions for screenings of video art are for people to take the work home. Video art has experienced a contentious history with the galleries and many of the people from the early moment have complex, conflicted and discontinuous positions about various forms of exhibition and distribution and the role of communities and individuals in determining the most appropriate paths. Gallery spaces are capable of creating very similar conditions to the intimacies that Ralph Hocking suggests, but it is a very delicate situation which is easily undermined and always haunted (by commodification and socio-economic legitimating forces).

I know that many artists feel that they are presented with enough difficulties in making their work and that the issues of exhibition and distribution may be beyond their immediate

concern or reach. Clearly, we all have responsibilities to find engaging paths for ourselves and those that are interested in our work while recognizing the influence that the path itself excerts. Hopefully, additionally having a responsibility to avoid becoming just another sale at the counter culture of the gallery / museum gift shop.

Tamiko Thiel:

It's not an issue of being simplistic, it is an issue of whether the work is compelling enough in the first tens of seconds that I look at it, that I am willing to invest more time into investigating and understanding it.

Damien Hirst is a classic example - you may not understand it, but it certainly grabs your attention, and that makes you willing to invest time into understanding it. We are all competing for the viewer's time, whether we are on-line or off, users ultimately decide for themselves whether or not to bother with our piece.

John Cage made incredibly conceptual works, but so sensual that you are spellbound by them and can't help but stay and listen through the whole piece. Complexity shouldn't be a license to make boring work.

So we have the responsibility to make our work interesting - instead of blaming the viewer for not being willing to spend hours with it in order to understand it.

Patrick Keller:

I have the feeling that most pieces are too complex to be displayed in museums: too long to understand, too long to see in full or even in part. If you were exhibiting 10 films in a museum: nobody would stay 15 hours to see it in full and they wouldn't get involved in it if they stayed 2 hours.

I consider a lot of contemporary art as big *old* frontal art for the moment: it gives itself in full in one glance. You rarely stay more than 5 minutes around or in a piece, most curators are now functioning in this context and I feel this is inappropriate for most new media pieces.

I think "some efforts" still needs to be done in lots of places / museums before exhibiting *New Media* works in a good way. Or maybe new *places* should be found / defined to become new type of museums.

Patrick Lichty:

Another conundrum has been the idea of sculptural aspects of screen-based art, or in a way, the issues of creating another form of 3D based virtual art. Representing these genres in the gallery is a challenge on so many fronts, from HCI to tech support to structural points. It's really quite amazing how daunting the task of getting a piece off the screen, into the gallery, and connecting with the audience is.

John Klima's works address the sculptural, so he has made the gallery a primary focus of his work. But this is not the case with so much work I see, and for these individuals, projections, while deepening the sense of 'aura', to me are an analogy for having a 4-meter high monitor, and little else. The fascinating thing to me is that somehow the gallery is the logical destination for new media. I can understand the logic to this in regard to the need to reach certain audiences, but perhaps the gallery is anachronistic. Too much of the work shouldn't be seen there in the first place, with regards to intent, representation, etc.

Melinda Rackham:

I'm just finishing my PhD thesis on networked VRML, which is more focused on why we deal in realist

representations in 3D space. On the nature of the VRML language itself, on embodiment and on the secret lives of avatars, and one of my conclusions is that we are at an early state of adoption and adaptation with this media - so we cling to the familiar.

From my perspective it's pretty simple, we aren't having failures we are having interesting learning experiences, little dead ends that don't work because the approaches aren't inventive enough yet. 3D as an art form and a specific technology isn't mature enough to branch out much, to take the leaps and bounds it needs too.

Taylor Nuttall:

The recent performance by Adam Nash was hosted at Folly, bringing multi-user works into the gallery space with different viewpoints into a virtual space
brought home the 3D non-linear multi-user experience to many who had previously not really understood it.

I am intrigued whether there are different aesthetics associated with single user / multi user spaces.

Obviously interface elements play a part in this, but what about the structures inherent in the space or narratives embedded into the coding etc.

How would our experience of say *Beyond Manzanar* change if we met other avatars in the space?

Melinda Rackham has 2 versions of *Empyrean*, is just the logic of the server
technologies or something else being changed?

Is the process of looking different? My experience with Adam Nash's performance that a multi-view shared experience seems to be bringing other things into the equation than the framing function of the computer screen / projection system. Some of the qualities of the *Memory Plains Returning* performance seemed to have nth dimensionality, with overlapping environment structures happening simultaneously on different screens.

3D Art - publishing

Lloyd Sharp:

Is there a useful way to talk about and look at these works in a publication with all the inherent limitations of that experience?

What would these books that focus on the work rather than the theory
tell us about the works?

It may be that these texts / books have problems conveying what is
unique and exciting about the 'realtime' experience and therefore default focus to art fame instead.

It's also interesting that it seems there is not a lot of talk in current theory about the failure of technology and how that can be as exciting as the successful use of it.

[personally I love those errant pixels, the little tears in 3D space and inversed normals]

Steve Guynup:

This issue of experience is a real one. But we aren't the first to face this problem. Game Theory, Film Studies, Sculpture, even Paintings have issues regarding reproduction in a book.

The question becomes one of "Is the best level / amount of knowledge possible being shared and discussed?"

Compare what's been published in other media to books on VR. VR books have few pictures, many opinions and rarely if ever talk about

design in 3D space.

As for what I want - more docs like this: http://www.archimuse.com/mw2003/papers/guynup/guynup.html

Brett Stalbaum:

This is quite an interesting paper, particularly as it goes to the problem of data representation in VR spaces. I am not as optimistic about the merging of 2D and 3D representational strategies in data visualisation. 2D strategies alone have proven quite powerful as a basis for representing multidimensional data sets. Of course, these emphasize the ability of the reader to learn how to read the representation, which may be highly abstracted and very specific to the particulars of the data.

How much mileage can be derived from merging a third dimension (or 4th in terms of narrative, time based motion through space), into the visualization strategies needed to approach, for example, a 100 dimensional space? Is 3D representation a very much more natural way to represent such a space? Which is essentially Steve's point when he states "Data representation in three-dimensions is difficult because spatial-visual information generated by the space does not support and often contradicts the data the developer wants represented.

My question is: is the layering of 2D and 3D strategies likely to be that much more clear?

As Lisa Jevbratt has been indicating recently, there is nothing wrong with allowing representation to be complex or difficult, and asking viewers to work harder to understand it. Human brains are powerful; thus perhaps one of the best representational strategies is to get out of the way as much as is possible and trust in the human ability to adapt to a woolly representation of complex data that suits the needs of the data first, regardless of our aesthetic or political preference for 2D, 3D, or time based.

Tamiko Thiel:

In many ways publishing an artwork in a book has the same advantages and disadvantages as publishing an artwork on the web: larger distribution since the object comes to the viewer instead of vice versa.

Sometimes when I see exhibits of photographs in museums I think it would've been better to look at them in a book - but realistically if they were buried in a book I wouldn't have ever looked at them. In a sea of books or websites it makes a big difference if a museum or gallery mounts an exhibit that says, "let's look at this work as a public group experience." Of course works whose scale naturally exceeds the size of a book or the size of a monitor clearly suffer from being compressed into that smaller scale. The experience is simply different. With interactive pieces the added bonus is that if you and your companion can't figure out how to operate a piece, there is likely to be someone else around who knows and can show you.

If you think about the opportunity to show a piece publicly in a curated show on a large screen as an installation instead of hidden in the privacy of someone's home who doesn't have the right equipment anyway, it is a clear choice. The drawback in a public exhibit is for works - like computer games - that require a long concentrated playing time in order to produce a satisfying experience.

3D Art – gender

Melinda Rackham:

One of the issues that really sparked for me is that of gender imbalance in this art form.Maybe that's because a lot of women have tended to deal with more theoretical issues like corporeality or play with more visceral imagery, or to be less concerned with navigational strategies, or architectural or database functionality. But then that isn't always true either, some only play with data bases and architecture e.g. Eva Wohlgemuth, Victoria Vesna, Mary Flanagan, program5 girls , Margarette Jahrmann, Linda Vigdor, Lynn Hershman, Nicole Steinger, a lot of whom have been shown in web3D before. Maybe this imbalance is another facet to the issues of why 3D work is undervalued, stifled, not considered arty enough.

There is a "heavy under-representation of women" who make 3D web art, as opposed to women who make other sorts of net art or art in general.

80% of the guests in this forum are male, around the same figures for women in the lab 3D show. From my observation the number is even lower for women who participate on any 3D related mailing list. Yet I see quite a few who are working in the higher tech end of 3D, like in CAVES. Maybe it's because they have been around longer and there are more women in academic networks with access to them?

→ **artists introduce their work**

Simon Biggs:

Babel http://www.babel.uk.et/ is not strictly a 3D piece, as it was coded in 2.5 D. That is, the code that allows the visualisation of the data-space that *Babel* is composed of was written by the artist and whilst manipulation of the visual field produces a 3D effect the data itself is 2D, mapped relative to a pseudo-3D camera/eye. Then again, when is a synthetic image every really 3D in that the 3D is a subjective sensory aspect of how time/space manifests its duality?

One of my primary concerns in making *Babel* was to escape the cultural hegemony of Western notions of space and how this echoes and sustains our paradigms of self relative to collective. In computer graphics it is hard to think of a way of creating spatially and temporally dynamic data without using a system based on either Cartesian or Polar co-ordinate systems, where the primacy of the individual visual point of view is constant. In *Babel,* everybody's point of view is given equal weight in the visualisation of its data-space in an attempt to move away from the Western dualism that conventional 3D visualisation systems are founded on. In *Babel* the visual field, as an instance of time/space, is created through the interaction of multiple viewers.

Babel is a site specific work for a non-site. The context of the work is non-physical. The site is an abstract thing...information space and the taxonomy of knowledge that all libraries represent...which the Internet, where the project is realised, is.

The Dewey Decimal numbering system, used in the cataloguing of library contents, is the key metaphor, visualised in a three dimensional multi-user space that is itself a metaphor for the infinite nature of information. In *Babel,* the Dewey Decimal system is used as a mapping and navigation technique. The structure of the library is re-mapped into the hyper-spatial that constitutes the Web. The Dewey numbering system is employed as a means to navigate the Internet itself, the taxonomy inherent in the numerical codes mapping onto web-sites that

conform with the defined subjects.

In *Babel,* viewers logged onto the site are confronted with a 3D visualisation of an abstract data space mapped as arrays and grids of Dewey Decimal numbers. As they move the mouse around the screen they are able to navigate this 3D environment. All the viewers are able to see what all the other viewers, who are simultaneously logged onto the site, are seeing. The multiple 3D views of the data-space are montaged together into a single shared image, where the actions of any one viewer effects what all the other viewers see. If a large number of viewers are logged on together the information displayed becomes so complex and dense that it breaks down into a meaningless abstract space.

Narvika Bovcon & Ales Vaupotic:

VideoSpace was created on the basis of three projects: *Javornik* (2001), *R III* (2002) and *VSA* (2003). These are autonomous artistic projects (that have been exhibited also separately), which should be conceived through the viewpoint of video-integrated media and conceptual art. Each of the three projects and of course their relationships (alliance) in *VideoSpace* are realised through multiple artistic media: as video tape, video installation and web site, in some cases also as an interactive CD-ROM (*Javornik*), traditional paintings acrylic on canvas (*R III*) and corporate identity (*VSA*). *VideoSpace* is realized on different levels, too: first as a conceptual diagram, than as an interactive CD-ROM with a virtual three-dimensional hyperspace and as a reduction of the CD-ROM version into the language of VRML three-dimensional net reality.

Three autonomous projects in the *VideoSpace* are connected to each other by the conceptual horizon that defines each of them and all of them in relation to each other. This is a triad of irreducible cosmic substances: the matter, the human and the language. With this triad, we are able to overcome some of the crucial contemporary philosophical biases embodied in critical movements – as for example formalism (that functions only in the field of language and to some extent in the field of matter), psychologism (with the human expressiveness through language), historical materialism and neomarksisms – of course in the theoretical form enabled by the metalinguistics of Mikhail Bakhtin and the archaeology of Michael Foucault. In the three projects all three substances are intertwined on the artistically specific level: the language is considered from the point of view of literary sciences and intertextuality, the human through the theories and practices of body art and performance, the matter through Bakhtin's and Foucault's theories of the materiality of discourse.

The VRML version of the *VideoSpace* (http://black.fri.uni-lj.si/*VideoSpace*/) is reduced to a platform in the black infinite space and the conceptual triad of the 'relatiogram' language, human, matter juxtaposed with the triad of the projects *Javornik, R III* and *VSA*. The space in the virtual reality of the VRML code is functionally reduced to the minimal possible information in order not to overload the Internet data transfer. The platform in the black space is manipulated by means of the possible movements in the virtual space: the translation with the functions of zoom in and zoom out, and the rotation of the object (the platform). Each of these manipulations creates a travelling in the space, whereas through travelling different points of view and interest are created and discovered. Thereby the user gradually approaches the 'relatiogram': he/she can grasp it from a distance by zooming out or proceed from one mapped identity point to another. Each of the identity points is linked to the web pages of the project in concern. Thus the spatially mapped relatiogram

is transferred to a parallel level of separate pages by the instantaneous action of the web links. The linked pages may be considered flat in comparison to the three dimensional translations in the virtual reality of the VRML *VideoSpace*. This is one way of exiting and re-entering the virtual space of *VideoSpace*; the other is the disclosure of the symbol of the relatiogram, which is the Star of David. It is the point of leakage of the virtual space into the real world space of a specific social context that cannot be perceived as a neutral appendix but instead it modifies the self-contained structure of the virtual reality and makes it dependent on and a part of the social network of discourses.

Steve Guynup:

My exploration of virtual space began in 1996. I suppose this makes me an old-timer. At http://www.pd.org/ that guy is (I believe) the largest body of virtual works created by a single individual. Coding, modelling, and concepts all come down to me. Still, the success of the work stems from a community of artists, poets and photographers who have allowed me to adapt their finest work to this medium. My work shown in web3 is *The Crystal Cabinet* available at http://www.pd.org/~thatguy/crystal

From the onset the process of adapting their work has been done with a careful eye towards pushing the boundaries of virtual design. Step by step, small modifications are made to interaction and navigation schemes. Beneath the poetic exterior the site is, in a sense, a handbook for builders of virtual space.

Roya Jakoby:

Rise + Shine aka *Parvaneh* (Persian for Butterfly) is available in 2 versions: FLASH: http://www.girlfish.net/motions/shine.html , and DHTML: http://www.girlfish.net/motions/

My participation in *Web3D Art* is almost kind of accidental. I wasn't very aware of the 3D qualities in my digital art work until a friend pointed it out me. The 3D elements in my work are kind of a by-product of my main area of interest, but I'm sure that those 3D elements in my work can tell something about how I try to deal with notions of the narrative, the interface and 3D in hyper-space (nice word, eh?).

The main aim of my work is to create a world on it's own (my world), communicate digital visual art with different narrative and visual means, achieve new aesthetical and emotional qualities in computer graphics, on-line art. I'm avoiding the grand text narrative - the various pieces on my website are studies of subjects and objects (codes, visuals) that I discovered, that I find interesting, visually, technically, and in cultural terms. I made a conscious decision to avoid multi-layered narratives, more specifically: I try to create digital art objects that express something through themselves, that don't require to much text and explanation, and that avoid stereotypical allegorical references. The aim is to create strong virtual objects, and to leave room for the user/visitor to experience the object.

Patrick Keller:

At fabric | ch we are architects trying to work on what we call contemporary space. Some of those works are included in the web3D art gallery or are digital gallery by themselves, some have been exhibited in museums or other networked places, some are made for clients and allow us to be much or less our own sponsors for research & experimental works, some still don't exist!

Because of the difficulties of showing large scale 3D work in museums, we are more and more considering the

‘demo’ like mode of intervention for our works. closer to performances in fact where they are some traces left after it and where the piece exists in its own state, own material, being still accessible or not -i.e. on-line-. btw could the *demo* that is really something coming directly from the digital culture become a performing art genre? we also look at new places to display the work, like clubs, national telecom *hot spots*, equipped offices, big public billboards, etc... so to say, we experiment the process of exhibiting in itself trying to find new and maybe more appropriate contexts to display the works. I must admit we haven't find the perfect one for the moment...

We have worked around this theme on some of our pieces. couple of years ago, we have suggested to canal+ to set up a "museum" into their public 3D chat [called "Le deuxième monde"]. the idea was both to try to implant "museums" in new spaces contexts and try to experiment specific ways of producing the content [distant collaboration, extensive use of email, collaborative works]. of course, canal+ gave us a lot of constraints. As the "deuxième monde" was a "realistic world" [paris], we had to keep gravity on, collision detection and so on. But in the end, the process revealed to be very interesting with an on-line opening, realvideo artists interviews that could be follow on-line, etc. the "museum", *La_Fabrique* can still be seen there:
http://www.fabric.ch/La_Fabrique

Another recent try we've made was in the extension and hybridation of a real contemporary museum - *electroscape 002*: http://www.electroscape.org/002
In this case, the idea is more to extend the space or multiply it! and that both structures [the digital as well as the physical one] could work together or in parallel. This hybrid space can then be exploited by both the commissioner of the museum, the curators and the artists. It will both exists with local access in the specific museum and on-line with distributed content but the main idea was really to keep it linked with a physical location and morphology and to extend the modes of appropriation of the structure. if you also check
http://www.electroscape.org/001
You will see what we've presented in the SIGGRAPH Art gallery last year where we were in the "performing artists" session. This interesting collaborative investigation about "screenscapes" and "screenspaces" is the result of a one week work session between fabric | ch in Europe and US and lab-au in Brussels and Berlin.

Michael Arnold Mages:

Mutual Assured Deconstruction is a democratised, musical-interactive space that a participant can inhabit both somatically and through the agency of a software-based representation in real time. The primary goals of MAD are to examine the transformative effect that new media has on the set of relationships engendered by a performance situation (primarily the audience-performer-artist triumvirate) and established concepts of space, experience and the body.

Documentation of live event at:
http://www.du.edu/~marnoldm/MAD/

Przemek Moskal:

Edward Tang and I are the authors of *3D Sound Sculpture,* which you can view at:
http://www.laksom.com/3Dcubes/flash/cubes.html

When we were conceptualizing this work, we both agreed that sound and 3D space have very strong connection. Therefore, we decided to concentrate our efforts on both creating playful environment in which the viewer can build his/her own sound sculpture and play back the sounds in

a non-linear way.

Adam Nash:

I am interested in Web3D in two distinct areas:
- (In multi-user form) as a live performance medium.
- As a sculptural medium. The spelling is intentional and explained below.

As A Live Performance Medium:
I'm interested in non-representational avatars as live performance devices within multi-user spaces. Currently I use a slightly modified version of VNet, much like Melinda does, to realise this. I am attempting to develop a performative vocabulary for 3D MU space that uses the qualities and properties of the space itself, rather than attempting to mimic or replicate physical space. (For this reason, I eschew the use of the term "Virtual Reality" which happily has more or less fallen out of fashionable use anyway. Likewise, I find the term 'avatar' problematic, both because it has quickly come to imply a direct representation of the user and also because of its dodgy etymology. I struggle, however, with suitable replacement terms).

My piece in *Web3D Art, Memory Plains Returning*, is more or less a sketch out of the above ideas, using a personal exploration of memory as the conceptual performative impulse. As a composer I am very much drawn to the spatialized sound capabilities of the 3D space working in concert with the visual sense, and I see this interplay as an integral part of the experience. Along with two other performers, John McCormick and Kema T. Ekpei, I will be presenting a live MU version of *Memory Plains Returning* at Folly (and on-line) towards the end of this month.

As a Sculptural Medium:
In a far more personal way, I am deeply attracted to 3D space as a sculptural medium with built in spatial sound. Sculptural + Aural = "Sculptural". I am thinking of sculpture in the sense of Moholy-Nagy when he said "The organization of light and shadow effects produce a new enrichment of visions," Moholy-Nagy eliminated shapes reminiscent of nature and sought to explore the relationships of light, colour, tone and non-objective form. I find sonicised 3D space to be a wonderful medium in which to explore these notions within the new context of the Internet.
http://www.yamanakanash.net/3Dmusic/mprintro.html

Melinda Rackham:

Empyrean is a multi-user VRML environment running on an Open Source VNet server available at http://*Empyrean*.cofa.unsw.edu.au/gallery.
The work plays with the concept of the net being a living organic space and re-dresses the seemingly prevalent net desire to remake on-line virtual space as a poor imitation of the "real". *Empyrean* offers an on-line environment, which has no horizon line to anchor oneself against, and no attachment to offline "hard" space. It is also a meditation on the form and beauty of virtual space, its electronic first nature if you like.. as the low polygon modelling makes clear that we are inhabiting computer constructed space and exposes its seams..

The world consists of 7 interconnected scapes each with a different aesthetic and theoretical reference. The influences coming form popular physics, some scapes are named after quarks, which are small sub-atomic particles - strange and charm; ideas of spirituality (*Empyrean* is named from the medieval term for the final and encompassing sphere of the heavens in an earth-centred universe. It also deals with ideas of the postHuman in a quiet visually crude way with a transparent but bloody and beating heart penetrate by information threads in the "truth" scape; with the

colonisation of the web, the isolation of virtual space, and of course the ideas of the tactility and sensory embodiment in networks the touch of connectedness..

I am drawn to VRML as it has the great advantage of operating within low enough bandwidth to network relatively complex environments containing multiple users, and radically diverts Virtual Reality from its early ideals of seamless sensory immersion into a duplication of hardspace made possible only to a few by supercomputing technology; into an easily accessible application which allows mass participation and interactions in mixed reality. Meanwhile it retains just that right balance of transparency and chunkiness to remind us that we are the creators of our own simultaneously subjective and objective viewpoints.

Users interact via avatars that have no human characteristics whatsoever, rather being cellular or electronic constructions. This addresses the trend to homogenize avatar representation to a tall western silicone enhanced stereotype. In the gallery space users primarily interact through sound and gesture. Avatars are very cute may squeak, squawk, blink, swell up and go opaque, gurgle, giggle, blush. By using means other than text for communication the multi-user VRML domain is not tied to a dominant language group, age category or educational factors, and it makes immersion in the space a fun activity. One of the outcomes for me doing the is work has been the delight of engaging with avatars as a new hybrid life form - a soft skinned species.

Sound is really important to immersion here, and its design by Mitchell Whitelaw is spatialized and attached to the etheric objects, which are mostly moving and often set at different pitches, so once inside the world the soundscape is constantly shifting around the viewer's avatar. In a sense you could navigate by sound alone as each zone has a distinctive soundscape, like the glassy crunching and grinding spheres of "chaos", or the frenetic cellular skating rink in "charm", or the tinkling birdsong of the delicately choreographed neurones in "void."

Ayoub Sarouphim:

World I is one of my first attempts at creating interactive Virtual environments. My concerns at that time were pretty simple and straight forward:
Creating an abstract urban space that the user might relate to Generating a organic "alien" form that would attract the user by it's intrusion Attaching sets of behaviours that will make the user go through unusual displacement methods. The project is available at www.mat.ucsb.edu/~ayoub and a downloadable version of Eon personal edition is available at www.eonreality.com under "support".

Grégoire Zabé:

Inframonde - is a participative cyberlandscape. It is composed of a multitude of facets, organized in a kind of tunnel. Each one of these facets is likely to collect a "photographic fragment" downloadable directly on line via the interface of the site. The idea is to constitute a "mental landscape" where the images brought by each participant amalgamate. This new space offers a kaleidoscopic perception, a fragmented vision of the world, recomposed artificially.

Méso-American mythology often calls upon the image of a complex underground world, an "inframonde". This space, unlike our hell, is a place of transition, inhabited by beings of all natures, which sail between various layers and degrees of depth, likely constantly to come back at surface, and to act on reality. Its evocation is seldom pejorative, but rather a source

of excitation of imaginary of the humans. It is included/understood like a complementary space to the "real" world . This acceptance of a balance ground/basement, conscious/unconscious, real/virtual, seems to us to be an element founder of the project, like this capacity to create a collective imaginary.

The interface of our project allows the transport of these individual perceptions, with an aim of creating a shared vision, through their coexistence in the inframonde. There is a real need for today creating tools which one can be adapted, transformed, on which we can modify the "source code". There is a guiding principle brought by the project, which functions like a rule of game: the facets are organized in five groups (ground, mid-ground, skyline, mid-sky, sky) which define the type of photographic fragments to install in the tunnel. Thus a participant can bring an end of ground, which will be supplemented by an end of sky brought by another or by itself. In thus rises a heterogene place, which is only one structure "to live", and which has the capacity to be rewritten perpetually, each image being able "to be crushed" by the arrival of a new one. A series of "snapshots" will make it possible to fix moments of this universe in mutation.

The integration of a chat, creating a multi-user space, also goes in the direction of a tool of cohesion and communication and experimentation. We hope that this richness will continue through the catch in hand by the greatest number of this project, and that actions and reflections resulting from various cultures will come to give him life.

The work deals with time, action/events/disruption, and representation / projection. The "new medias", since cinema at the end of 19th century, gave the possibility of "sculpting time". Multimedia and especially web3D made of time one of the first "building" material. It induces a deep modification of the place of the user, and of our representation systems. The point is not anymore where it takes place, but when, and what part of it can see. The work is not only what I see, but a part of it and especially a moment of it. In that line, we can talk about an ecology of cyberlandscapes. The "participative" way of building projects produces a strong link between spectators. "Virtual reality" (even if I don't like this word) becomes an hybridisation of real spaces, a continuation of it. These "social links" are almost as important as those we build in "real" spaces. My work of designer makes me specially aware about that.
http://www.inframonde.net

→ cultural perspectives in 3D

Simon Biggs:

One of my primary concerns in making *Babel* was to escape the cultural hegemony of Western notions of space and how this echoes and sustains our paradigms of self relative to collective. In computer graphics it is hard to think of a way of creating spatially and temporally dynamic data without using a system based on either Cartesian or Polar co-ordinate systems, where the primacy of the individual visual point of view is constant. In *Babel,* everybody's point of view is given equal weight in the visualisation of its data-space in an attempt to move away from the Western dualism that conventional 3D visualisation systems are founded on. In *Babel,* the visual field, as an instance of time/space, is created through the interaction of multiple viewers.

People experience things from their own physical point of view. What they see is usually a function of where they are and what physical attitude they adopt relative to the subject. With augmented vision (periscopes, mirrors, remote cameras, etc) we are able to

see things from places where we are not present. With time-shifting technologies, such as the video recorder, we can also see things from the past; a time and a place we may never have visited. This is extrapolated through the remote networking of sites that are actual installation spaces; where the physical movements of viewers in the space generate multiple perspectives, linked to other similar sites at remote locations or to other viewers entering the shared data-space through a web based version of the work. The processes involved in such a practice reflects on the non-singularity of being and the sense of self as linked to time and place.

Non-western world models and anything that is different to what we are familiar with is always interesting, if only to remind us of the contingency and relative nature of our beliefs. The underlying issue for me is that of ontology, how we feel and believe ourselves to be.

Adam Nash:

Many artists are thinking about this at this juncture in history. I think the point that Simon was trying to make is that ultimately even the so-called 3D space is the product of the last few hundred years of single-point perspective (a feedback loop with arrogant expansionary European culture and worldview) and therefore the rendering device (including the screen and the VRML, or whatever, browser/rendering mechanism and indeed even the idea of computer graphics) is trapped within a Cartesian space view.

3D spaces “seem” to offer a greater chance to escape this paradigm. In actuality, they don't - it is up to artists to conceptualise a non-Cartesian single-point perspective (multi-viewpointed?) paradigm, after which the software for realising it can quickly be built. Having said that, though, it seems to be that scientists (rather than artists) are really grooving on ideas of parallel universes and so on that may provide paths to this kind of state - in the May issue of Scientific American there is a long article about parallel universes that includes sections on the 9 dimensions, and how space+time didn't separate for at least 50,000 years after the big bang. Of course this is a very western-flavoured view to take, as evidently other cultures have been comfortable with multiple perspectives for a long time.

John Klima:

Regardless of whether a mathematical model represents a manifestation of cultural hegemony, the existing model is the only way a synthetic representation of space could ever hope to exist in the first place. If the algorithmic supposition of the system employed is such that the rendered space represents "the real," regardless of the number of conceptual viewpoints combined to form the final image, to the individual viewer viewing it (and certainly to the domain knowledge the rendering system represents) one actually sees only a properly formed three dimensional space, and any effect otherwise is an optical illusion. The world is all that is the case.

In a practical sense, the only way to question the rendering system we are all employing, is to find and exploit the bugs in the system. To show through the system's limitations, where it falls down, where it fails. Divide by zero.

Alan Sondheim:

However, I wonder if it's possible to define or delineate these co-ordinates (polar etc.) through neural networks; in other words, place the co-ordinates themselves within a fluctuating system. I'm thinking among other things of the paintings of Kuo Hsi and other Chinese landscapists, where the

perspective is complex and heterological, without any hegemonic positioning….the paradigm need not be polar or Cartesian - that these co-ordinates are only a mediative representation producing something in 'real' space for the viewer.

John Klima:

Hyper-space (nD) is incredibly fascinating. however, I can't really "see" the nth dimension, because I have nothing to use as a referent. On a 2d screen (or in a painting) I can perceive 3D because I exist in 3D. However if I had a 3D screen, I still won't perceive the 4th dimension because I don't mentally exist in that 4th dimension. Its the flatworld problem. However, I certainly don't deny that nth dimensions exist, we can conceptualize and even implement them mathematically. In art, it all ultimately boils down to an individual viewer, existing in "this" world, coping with the thing in front of them. Spatial representation can be metaphoric, coded, symbolic, or scientific – we are all always completely stuck with how the universe actually is.

Jim Andrews:

There are such things as non-Euclidean geometries. They generally preserve the notion that a 'straight line' is the shortest distance between two points, but if the space is, say, only the points on the surface of a sphere, then a 'straight line' turns out to be part of a great circle, i.e., the shortest distance between two points on the surface of a sphere is part of an 'equatorial' circle.

The geometry of the universe in some cosmologies is supposed to be non-Euclidean. In the big bang theory, there's an origin point to the universe, the beginning of time, and the universe is supposed to be an expanding four-dimensional sphere. When we look out into the sky at night, the further we see, the further back in time we see. So that no matter what direction we look, if we could see far enough, we would glimpse the same point, the origin of all things, the beginning of time, the meeting place. All lines intersect in this geometry. There are no parallel lines.

Regina Célia Pinto:

Do not forget that all straight line is a curve line of infinite ray, so that, each straight line segment which is the minor distance between two points in the Euclidean Geometry is a curve segment of infinite ray. Geometries are really beautiful are they not?

Adam Nash:

I thought scientists generally accepted there are 9 dimensions? Don't quantum physicists now talk about 'our' big bang, rather than 'the' big bang because they have accepted that there are an infinite number of parallel universes? I imagine that there are a lot of possibilities in infinity...

I find it interesting to play around with what you call the 'machine's understanding' - one of the things I find most rewarding about working with computers is telling them to do things they have not been programmed to consider. I love the, often quite startling, glitches that result when you do some 'physically impossible' geometry in a 3D program - they freak out! They don't say "that is not possible within the conceptual framework of space I've been designed to interpret, let's talk about it", they render it anyway! And often it looks wonderful. As Melinda has often said here and elsewhere, she likes to show the seams.

I'm not interested at all in how web3D can be used to represent the physical world, or visual perceptions thereof. I much prefer exploring the properties of the space itself - there is no gravity unless you assign it, no up or down unless you assign it, no here or there

unless you assign it, and so on. Of course when it is rendered to the screen it attempts to do it in conformance with the Cartesian framework, but then it goes and does it in a 2D space, which is just as unrelated to the space we walk around in isn't it?

John Klima:

I love the notion of "our" big bang, as it parallels the Brahman (I think) myth that the universe emanates from the navel of Brahma as he sleeps on a giant lotus leaf. It springs forth, expands, contracts and is destroyed, over and over again. Nobody knows how many times the universe has been created, existed, and then destroyed.

To your point about the glitches of a 3D rendering system, indeed the renderer never complains about data that doesn't look right to us, it draws slavishly what ever we tell it to draw, and it does so according to the rules we define for it. So, if we create a particularly wonky set of data, we know its wrong but the machine doesn't. Our understanding of right and wrong, in this spatial and graphic sense, is what I find interesting here. My personal tastes lean not toward the "correct," but definitely away from the glitchy.

Alan Sondheim:

Another way of looking at this is our psychoanalytical tendency at this point to want to escape from the hell of our own reality - and to escape at a most fundamental level

Adam Nash:

To me, this point introduces the 'realism' argument, where the 3D graphics industry has become completely, and very unhealthily IMHO, obsessed with trying to trick the eye, which is such an old fashioned idea. I don't believe that any person's brain is ever, even for a nanosecond, actually believing that what they are seeing is 'reality'. The much vaunted 'suspension of disbelief' is a myth in my opinion: there is no 'suspension', rather a very conscious, and quite sophisticated, dualism or multiplicity of perception. Because of this, I think there is a much greater chance of producing moving art by not worrying about whether the 'wires' can be seen or not.

Christina McPhee:

Well, this reminds me how fascinating it is how Sergei Eisenstein invented the technique of montage through his imaginative engagement with the famous etchings of Piranesi. The Carcieri series, or invented prisons, in which, as in 3D VR, a necessary reliance on Cartesian xyz co-ordinates subverts itself in convoluted 'impossible' spaces that overlap and torque like fluid avatars. Eisenstein recalls his elation:
"I ponder what would happen to this etching if it were brought to a state of ecstasy, if it were brought out of itself...ten exposions (sic) will be enough to 'transform' ecstatically this diagram which has been drawn in front of our eyes..." Sergei Eisenstein, from "Piranesi, Or The Fluidity of Forms"

Note that it is the bringing out of the self, the exstasis that is the seminal connection to montage from the prison series. And this, so ironically, since the imaginary prisons are like endlessly looping passageways without exits, a Sartrean universe, kinda like the 3D world.

Alan Sondheim:

This is what Polyani calls tacit knowledge, which is always gained through familiarity. The same thing - taciticity – happens even in reading a novel, when the world of the novel at first appears unfamiliar (and if scifi, even with new language, neologisms),

and then over time and reading, becomes almost a second home.

Simon Biggs:

Whilst I said it is difficult it is also entirely possible not only to imagine non-Cartesian modelling of space but also to write code to do it. It is only difficult because it requires you to use your imagination to think outside a set of conventions that are so fundamentally hegemonic in determining how we see things that we think things are actually the way we think we see them.

Plentiful examples of non-Cartesian single point spatial rendering models exist. I think here, for example, of how Medieval artists dealt with space and time in their work, often having different temporal aspects of a scene placed in the same spatial frame whilst simultaneously breaking up that spatial frame to allow for a rendering of the image that took account of the relative values of the objects contained within that spatial envelope. That is, Christ on the cross would loom larger than the figures around him, in defiance of our contemporary expectations of spatial representation, not because these artists were unable to get the relative scale of things right but because they were less interested in a "photographic" rendering of things and more intent on an imaging strategy that addressed the cultural value of things.

The spatial systems you are arguing are inescapable are only that if you choose to work within a certain world view and specifically choose to work with off the shelf technologies based on that world view.

John Klima:

As a person intimately involved with the medium, it becomes difficult to see it freshly. The same holds true for video games. I look very intently at how they put together the scene, I make guesses as to how it was programmed, I look for things to steal. Your average consumer of video games probably doesn't do this, and probably tries very hard to avoid noticing the cracks in their fantasy. So, in a sense the suspension of disbelief is a form of denial, really.

The case of Age of Empires, or revisionist history through realistic rendering techniques and ultimately through an interface, we see a problematic state. I make reference to this in my works *The Great Game* and *tgg - Iraq expansion pack and campaign maker v1.0*. It's a disturbing trend towards a completely mediated experience, where real world events are experienced in real time, through an interface rather than in the flesh. But history has always been relative, the winner always writes the books, and one can't really expect the new mediums to be less subject to this phenomenon.

Unfortunately, the tools available are all Cartesian, and alternatives must finally be mapped to that Cartesian space prior to final presentation. This to me is an inherent flaw in the endeavour. It's Heisenberg's Uncertainty Principle. Inevitably, the tools we use to measure the results of the experiment effect the outcome. Cartesian space does not represent an arbitrarily arrived at 'world view', determined not by how things are, but by the force of western greed and self-righteousness. There probably actually is this thing called reality, that actually does play by certain rules, that we are endlessly in the process of trying to understand, and that though we are all limited by our cultural background, sometimes we just get it right. I'm not trying to suggest that Cartesian space is the "correct space" I'm saying its a really really really useful space, a close approximation of our everyday perception, regardless of the culture that produced it.

Lets not forget that space (i.e. real

estate) has always been commodified, its not just a contemporary state. That notions of ownership and commodity of "virtual space" (domain name registration for example) have occurred is no big surprise. The homogeneity of our virtual spaces has less to do with them being commodified (I don't see that they are commodified, or homogenous) and more to do with, as Simon mentioned, the proliferation of off-the-shelf tools functioning under the same mathematical model (a very useful model in my opinion).

I'd argue that the spaces we are creating as artists are far from homogenous, as is evidenced by the diversity of approaches in the web3D/*Lab3D* show. That the spaces created by the gaming industry seem homogenous is no big surprise, driven by "market forces," namely teenage boys. Let us also not forget that the gaming industry, every now and then, does offer alternatives, at least in terms of paradigms if not mathematical models. The Sims is a fine example. The success of the Sims I hope will encourage the industry to further push the paradigm envelope. The failure of "the Sims on-line" is an unfortunate setback.

Simon Biggs:

There are numerous examples of cultures where space has not been commodified or territorialised. I think of the Australian Aborigines who see themselves as the product of the land and as its children (although simultaneously its custodians) and who do not have any notion of property. They do have the idea of having "stories" which they must protect, but they must also pass them on to the next generation to also protect and keep alive. It was quite a shock to them when Europeans arrived, who then immediately began building fences and carving up the land.
In Islam whilst the idea of ownership is accepted the idea of making a profit out of it is not. In the UK, for example, it has been traditionally impossible for a Muslim to buy a house (unless for cash) as it is against their beliefs to charge or pay interest on loans or savings. This is seen as profiting from the ownership of things, which is not permitted. This is now changing as Islamic mortgage models are being imported from the middle-East and even adopted by some of the big UK banks for niche marketing. Of course, this is not without its contradictions.

I am not seeking to argue that this makes these cultures superior to ours...just that to accept the idea of commodification, and all that flows from that, as default is incorrect and highly damaging to a potential broadening of possible ways of organising things (with which all creative people must surely be concerned). It is probable that most people on this planet actually live in non-commodified cultures (1 billion Indians, 2 or more billion Chinese, large tracts of Africa and Asia, would have no idea what we are talking about in respect of many of the referents we have treated as default in this discussion to date).

The examples that are arising in this discussion, such as commodification, Cartesian space, computer games and Western teen-culture demographics should not, in my opinion, be treated as central issues in this debate (they seem very marginal to me). Certainly, my own practice has nothing to do with computer games and never has (I hate the things - a noisy and adolescent waste of time) and as an artist who has chosen to work in a post-object format and with no gallery affiliation (when young I had such a thing, but consciously walked away from it for moral reasons) commodification is something I perceive to be resisted or even actively countered. The very concept of a "demographic" is just another instrument in the process of commodification and people that use

such language, as a matter of course, are therefore commodifiers (determiners of property rather than creators of shared experience).

I chose to work with computers not because they are associated with the military-industrial complex (this old-fashioned term seems more relevant today than ever before), game culture or "straight" space but because they allow me to arrive at new relationships between things that might assist in the deconstruction, even destruction, of a commodified, territorialised and overly signified world.

Given what I have just written above, it should be clear that I would regard the gaming industry as deeply problematic and ultimately alien to any creative and experimental practice. The fact it is an industry is bad enough, but worse, in its very central metaphors the "game", whether a computer game or not, functions to establish models of human behaviour that one can only regard as negative, promoting attitudes such as competition, ownership, control, etc. These are the very values that I, and I have always felt most artists, have chosen to work away from or against...that is why many chose to be artists...no?

John Klima:

I think most artists simply endeavour to make something beautiful, or meaningful, or emotionally resonant, regardless of, or indeed in spite of, the world the work exists in.

→ 3d games and 3d art

John Klima:

I feel games are central to a discussion of new media art in general, and 3D art specifically, for a great many reasons. Games represent firstly, the highest level of technical sophistication within this medium. Us artists, like it or not, are constantly compared to the gaming industry and its standards. Anyone with a lick of sense realizes that the comparison is tenuous at best, as if independent film is somehow inferior because it does not have the same production values as the Hollywood product. However, when a work of digital art, or independent film, comes close to those standards, it is noticed and appreciated.

Secondly, there are the navigation and interaction paradigms that games introduce. Every so often a game changes the expected devices of navigation, in service to its play.

Thirdly, there are the AI and behavioural algorithms advanced and developed by the gaming industry that seem to crop up in artwork all the time. These are very exciting concepts to me and a great many other artists. They represent a "soul of the machine." Behaviours + 3D space = reality, for me.

Fourth, just the thought that these machines can indeed be employed simply as a "waste of time" as you put it, I like to think of it as simply being "without specific function or utility," establishes a certain criteria for art in the first place. If the general understanding was such that a computer's sole purpose is for getting useful work done, there would be no possible hope that the computer could ever be perceived of as an artistic medium.

Fifth, very occasionally, some darn good narrative unfolds within a game world. Narrative is, or can be, art.

And finally, tying a bunch of these thoughts together, what thrills me about the medium, and about games as its commercial manifestation, is this notion of a whole, real, and cohesive universe, existing entirely within all those transistors and chips, playing by

its rules and laws, coming into being entirely through a descriptive language - in some cases reflecting the rules and laws of our universe, and in some cases turning them on their head.

Tom Betts:

I agree that the games industry is victim to all the evils of commercial exploits but...so is film and writing.. its just that the games industry is less mature than the others.. I guess you're gotta be in it to win it.. or something like that..

Gameplayers (an increasing mob of nextgen kids) can fly helicopters around vice city on their playstations. They are familiar with digital interactive media and usually skilled interface users. Games often provide a high level of interactivity but have poor conceptual content. Interactive art usually presents more abstract and complex concepts but has terrible interface/interaction. Ok so 'that's not the point of the work' you say. But what irks me is that there is very little work that addresses this. As a result many people will dismiss much interactive art as just a screensaver or digital toy. This includes me and was my reaction to much of the *Lab3D* exhibition I won't go into individual pieces but I found I spent less time with a piece than I would do at the national gallery.

I am happy that this sort of work is being promoted by contemporary galleries but I felt that the exhibition/format had a lot of problems. I guess I am airing my own apathy here but I'm sure that it is a fairly common feeling for many 'teched up' people. I'm not asking to see work that requires a full knowledge of C++ just some things that don't seem to patronise me.

Steve Guynup:

While I don't agree with some aspects of Game Theory there are many many interesting game theorists out there. They, like us, are just trying to work things out. See the folks at: http://ludology.org/ Dr. Janet Murray author of Hamlet on the Holodeck is this month's special columnist.

Still, game companies are economically adverse to dynamic change. Will Wright had to threaten to quit (and actually mean it) to get the Sims created. It can sometimes happen, just not often. And whether you like the Sims or not, it was something quite new – even experimental.

Somewhere between high-level game concepts and low-level coding lies a region of design that's really at the core of the interactive medium. It's here that causal relationships, feedback cycles, information propagation and emergence mechanisms reign supreme. This is what Wright calls "dynamics"; the rules and principles that govern the way in which structures change through time. The design and use of early prototypes is covered as a means to explore and sculpt a variety of dynamic systems.

Melinda Rackham:

I am perturbed that gaming has put a massive degree of expectation onto users of and 3D art. This is above and apart from the seamless, slick 'persectival' production values that John pointed out where net.art can't of course compete. The critical issues are, I think, gaming and film industries, which are becoming increasingly intertwined. This puts an unconscious expectation of structure into the minds of users.. because there is a rhythm users are looking for, its the same as a movie rhythm.. or a porn movie rhythm would be a better example.. bit of talk-bit of sex-bit of talk-sex-talk etc. I noticed this adrenaline type rhythm really strongly in action movies, and that rhythm is really pronounced in games, bit of exploring-bit of killing

(or points scoring)- bit of exploring-killing etc.

So, when you get to a piece of 3D net art.. you may feel let down before you even do anything with it. The expectation of the adrenaline hit isn't there, the primate body chemistry peaks and troughs to hook you in haven't happened. I have had people say to me about my *Empyrean* work.. "well what's the point" ..what are you supposed to do when you can't find obvious markers of reality or game play.. "you mean you're just supposed to look at it and think about it?" "how can avatars communicate if there is no text input?" "jesus christ.. art that wants you to meditate on it.. !!"

How long are we supposed to engage a viewer for? 30 seconds to 3 minutes, 10 minutes?.. What is the average time in front of a painting, 20 seconds..? Yet we demand so, so much from 3D art. It's always in relation to other media.. never valued by its intrinsic qualities, never for itself. As Roya was saying, the 72dpi aesthetic is beautiful. So is the lagged, polygony and uncertainty of 3D worlds… and I think that only happens when we stop the comparisons ourselves.. when we stop trying to mimic other forms, accept the parameters and work with the subtleties.

geniwate:

I like games and I like art but I like them in different contexts and different moods. I reckon the sorts of experiences we seek from games and art are rather different; I think it is slightly misleading to try to put the two on the same experiential continuum.

Lloyd Sharpe:

Yes - why is there a need to look only to the 'larger' 'wider' 'bigger' audience when developing these works?

Isn't this a fundamental issue with these works - why is the work made using and exploring those technologies? and is it art? or commercial product? or something of a different variety? [i.e. is art just another commercial realm?]

Is it actually important to engage the same audience that is somehow engaged by the spectacle that is 3D kill fests? [or maybe just Tetris?] I can see how a 12 year old will get involved in a Diablo expedition... I have been addicted for years!.. but do I have anything else to say or other ideas to explore with that 12 year old - probably not. I would rather 'play' with someone else in art...

Simon Biggs:

I am not saying there is no creativity or innovation in the entire commercial media sector, in TV, Hollywood, most other cinema, 99% of the net, and most of print. Nor any craft. I agree, there is buckets of it.But the values that underlie the whole thing ensure that anything of value is crushed and all you are left with is the pornographic exploitation of the "user". ....and "user" is a good word as the makers of this stuff are no different to the drug dealers who are also looking to develop new "user" markets (in fact I have a lot more time for drugs than for contemporary media culture...). Melinda's description of the adrenaline driven quality of contemporary games and cinema is exactly what I am referring to. The main gland I am interested in is the brain...not the adrenal or testes.

Tom Betts:

To me the best art reflects the culture it exists within, not just the output of a brain. A brain doesn't function like a suspended entity divorced from the body, it's a reflexive system within the body. This is a very modernist stance and also one that hints at notions of superiority. Art should be about more than just the life of the mind.

The current digital art market is one of the most obviously fashion driven examples. I'm sure that we are all producing 'products' for an audience that consume them, and where money is exchanged there is a capitalist structure. The difference between shit films and good films is a value judgement, but if you have to pay to see them or make them then they are still products in a marketplace of users and commodification. You either have to work within the system or not, or work within it and shout about it?

Adam Nash:

I think that its wonderful that Web3D can accommodate, in the same exhibition no less, one artist who thinks that "games are central to a discussion of new media art in general, and 3D art specifically", and another who dismisses games as absolutely irrelevant, a "noisy and adolescent waste of time".

For myself, I think the games industry makes Hollywood look like a positive bastion of progressive, intellectual, non-sexist cosmopolitanism. However, there are quite a few games I have enjoyed playing over the years- some, like Zelda on N64, have a special place in my heart.

But, I don't think I've ever played a game that made me think.
Art makes a person think.

Regina Célia Pinto:

The important thing about games is just to know how they can influence ART. On the one hand lots of artists are working with games now and those games make one think. I am speaking about Art games. You certainly know Arteroids and perhaps The Black and the White, reflections on fog, which contains the Fog Game.

On the other hand did you see Matrix Reloaded? It is the aesthetics of a computer game, you can watch the movie only observing the visual narrative. The narrative with images is much more important than the textual narrative. In this way, what you think about the movie is not the same message you receive if you read the legends (as me) or listen to the actors.

To an artist who works with games the challenge is: how to use the aesthetics of the games to do art and to make people think.

Roya Jakoby:

Game technology itself is not the problem, it's what you make out of it. Game orientated artists should take from the commercial sector whatever is useful to them, whatever inspires, revolts, appeals, cries out loud. Ever more so, since the commercial sector itself doesn't have any hesitations to feed itself of the arts.

JonCates:

Being concerned w/+ emeshed in digital cultures locates us in/on this terrain and among various aspects such as game -> art -> video -> theory practices, commerces + histories. In terms of the expectations of the markets, we should not forget to call attention to the constraints of the local, regional, national + global art-markets and the ways in which these constraints function to determine the qualities of the work produced. In terms of expectations for the User Interface and responsiveness, a work such as " ecosystem" is set-up to make these direct connections (via a PS style controller) and thereby intentionally exist on the "same experiential continuum" (as the PS platform and the games available [as well as the entire history of Sim building games]). This connection means that the experiences will be compared, contrasted, etc + opportunities exist for (meta-level) commentaries w/in them. This opportunity when utilized, imho, is

what can create + sustain excitement, energy, etc.

Tamiko Thiel:

I'm also not a gamer, although put me in front of a console and I'll fire away like crazy - it's just that I'm not very good, die quickly and have no interest in investing time into improving my game.

There is a huge group of people out there who are really excited to find 3D games technology being used for other purposes - including a lot of girls who are not interested in the first-person shooter games but are really attracted to slower, more poetic pieces and have to be torn away from the joystick by their parents. And these are exactly the people who DON'T like the competitive aspect and the porn movie rhythm. But it's also clear that the computer games industry is training the upcoming generations for us, so that we don't have to stand there and tell people how to use our work.

I do believe that there is simply a lag time and 3D will enter the gallery system at some point, just like video did after being ignored for so long. But I think it is also important for us as artists to examine the time-based interactive experience and understand what makes it compelling for the user.

Mez:

...this sparked off a chain of thought centering round the idea of ANG [_Active Narrative Gathering_]...by ANG I'm referring 2 how some m.mergent forms of art|n.tertainment|simulcra r interconnected via narrative threads b.yond parent forms/individualised media constrictions...i.e. if u want the complete narrative picture [i.e. join-the-story-dots-campbellesqueness-hero-journey-style] that is available when watching _Matrix Reloaded_ u *must* watch/collude with satellite|parallel constructions that enhance [i.e. offer loadings] that complete the story jigsaw - like _Enter the Matrix_ video game + The Animatrix.

This isn't a new phenomenon.....look at _Twin Peaks_ for instance [movie series, book (_The Diary of Laura Palmer_) and movie]...but it seems to be becoming a more dominant pattern...look at _Donnie Darko_ [movie + website] + _The Blair Witch Project_ [book, movie, website]...not to mention _AI_.....also the conversion of comics/books in2 film, games in2 film [_The Final Fantasy_ game + film].....

It's like audiences r n.couraged 2 step outside the restrictions of mono-media absorption channels + actively seek additional narrative components elsewhere...bit like an ANG cultural engine I guess....

jonCates:

Celia Pearce, a visiting scholar who studies games at the University of Southern California's Annenberg Center for Communication, is using Pokemon as a model to teach young game makers how to create what she calls "transmedia" games that can straddle many platforms and media.

I like Pokemon wherein Pokemon Island becomes a hub in a network of meanings, activities, technologies, platforms, etc. It is interesting to see these tendencies increase + the Matrix seems to be a place where these attitudes are very self reflexively @ play.

In terms of the collection aspect, most of the activities in Pokemon are driven by + inspire a sort of hyperactivated capitalist/colonialist collection. I'll admit to having collections of unopened Pokemon cards + toys in my collection. In any case, this is the collection of art as an activity very different from previous situations

which functioned as a form of economic/social support.

Barrie Collins:

What you bring to the viewing of a work, whether digital/interactive or traditional media, influences how you see it, experience it. In this respect also if you bring to your experience of a work a meditative, informed state of mind you are likely to get more out of it; so with sound being able to listen in a fully focussed way elevates, if you like, your experience of it.

So with games, its nice to lose yourself in the adrenaline rush but it can be a different thing when encountering a work of art, whatever the media. James Turrell says 'I want to address the light that we see in dreams and make spaces that seem to come from those dreams.' Its interesting that before white explorers came, many South Sea islanders had no sense of time, the idea of time that westerners have, or as Janice Joplin once said 'Its all one big day baby'.

With 3D digital art - what are your expectations of it? Or, what kind of person are you? I'm all for slow art, but I like a quick fix occasionally.

→ the art and aura of 3D

Roya Jakoby:

How can digital artists tell stories without words? Should they? Is it possible?

Steve Guynup:

I've always thought that moving through space created a narrative. (the term narrative is used loosely)

So what about us - do we control time and space? Well, space I do believe we as builders completely control. Nothing is there or does anything that we didn't (even accidentally) program. Time on the other hand we don't control. The user moves through the space at their own pace and in their own directions. They create their own linear narrative, their own timeline of events.

In the end, we negotiate time with the user. We do this by creating pathways in which we hope/have to follow our timeline ...Much of what we do to define space is really to affect time.

Tamiko Thiel:

I agree with Steve: we control space and use it to negotiate time with the user. The user in turn has the responsibility of actively investing their time in negotiating the space that we have provided for them. In doing so they "create" their own narrative - because narrative is basically events happening in time.

I like to think of what we do in terms of "choreographing" the user's experience: we set up structures of space and embellish them with constraints (no you can't walk through the walls; try the door instead, etc.) and lures (if you've already seen everything in here, how about checking out this new little thing I make appear outside? etc.) in order to shape the possible experience that the user can have in that virtual space. The user still has to execute the movements themselves, but within the "physical" and dramatic structure that we have created in order to SHAPE their experience.

So unlike in classical music we are not controlling time - in an interactive work we actually do NOT usually want to force the user to proceed at a certain rate, because when we remove their ability to actively shape their own experience we remove a large part of their engagement with the piece.

But we ARE setting up structures that

form a framework in which the user's own engagement should produce a dramatic experience. No user engagement: no experience. No framework: no drama.

Creating an interactive artwork means creating a framework. Creating a narrative in this context means starting somewhere, ending somewhere and arranging the events that happen in between. We can perceive events out of time but to "make sense" of them we seem to be hard-wired to create narratives, i.e. descriptions of events in time with the implication - not necessarily desired, but hard to avoid - of cause and effect.

Grégoire Zabe:

I think in a certain way WE (the one who create the interactive work AND the spectator) are "modelling" time...

Of course not like the editor of movies do. We are sharing time with users, trying to imagine speed , paths and events, and then giving the freedom of imaging and using all the other possible times. Users are modelling time of works. In this axis the relationship between creator and user is really interesting. The dimension of a shared and de-localised space is for me an important part of web3D. We can access and act on it at any time/everywhere you can find a computer and a connection. The spectator can 'perturbate', make varying and let a trace of presence/ absence in work. I often ask myself which platform or system are able to receive collective works... I think web3D is one of those...

Steve Guynup:

"modelling" time...
It's an interesting term as it implies something new to VR. Perhaps there is a much deeper integration between objects/environments and time. Something fundamental. Many works shown (mine included) use colour as a "lure". In this sense, would it be appropriate to call colour a component of time?

Melinda Rackham:

… yes it is a continuum .. colour sound space time.. don't exist in separate axes.. or dimensions. If we work in 3D space then colour has a value in x, y and z axes. They are all points and as points are never really fixed, but have vectors emanating from them on each axis, so each colour, or space/ time slice, or whatever is part of the other dimensions.

Steve Guynup:

As for constructs of game theory and scripted space, both apply - but sometimes they leave me with an uneasy feeling that I am simply building a maze and treating the visitor as a mouse moving through it. All for the purpose of my conceptual cheese.

Melinda Rackham:

You are the maze builder.... but any artist does that.. a painter knows which way to move your eye across a canvas with colour texture and rhythm.. they might do it "intuitively" but they are using a programming language when they construct a painting..

You as artist are also sometimes the user in your own world.. and the user is never free, they may have lots and lots and lots of choices.. as we exist in computer constructed space, in fact in all space one could suggest, in a finity.

I like to think about the structure of the VRML language itself and notice the values which get assigned to everything. There is a geographic limit, a time limit, a processor limit, a pitch limit. You as author do set gravity, do set collision, do set sensors and triggers, anchors, do set horizons, do control what the user sees at a time and distance by Billboarding and LevelOfDetail, etc, so you do set the

physics of the world.

We make life worlds for avatars, so we should be generous and inventive in our architecture as they deserve to have a nice place to play. 3D space is a co-operative thing, where we simultaneously have all control and none, and the spacing, regularity, colour, etc make time.. make emotion, make corporeal experience.

Steve Guynup:

I agree, but I was hoping to make a narrower point. Perhaps contrasting the way we as web3D/vr developers influence and address narrative time and those who do video games. I'm also leery of imposing a new set of symbolic values on a modality(s /dimension(s) - Or of interchangeably like "colour = time". It can work of course. If it didn't we wouldn't have written/oral language. But it does not always work.

The early Gibson Cyberspace movement failed partly because it didn't understand the conflict between spatial data (shading & perspective) & abstract graphical data (as seen in charts & graphs). Second the issue of time and narrative infinitely ups the level of complexity from merely looking good from the front, left or right. Combining the two is maybe not impossible - but hasn't been done yet.

Adam Nash:

Indeed it's true. When I use Web3D as a performance medium (either MU-style where the performers are performing the space itself, or single-user 'active' where I will play the space à la musical instrument to an audience watching and listening to a projection, or single-user 'passive' where the user accesses it on the web) it has slightly different inflections to those already noted. It becomes probably much more analogous to music, because the time is quite strictly controlled by the artist. It is probably 'less interactive' than the modes discussed so far. Certainly if the audience is watching a projection of my computer screen as I play the piece then they have no control over any aspect of it.

When logged in, or using it on the web, the audience for my pieces generally has more control over the negotiation of the space rather than the time. In other pieces they have explicit control over both space and time and nothing will happen without their input, in still other pieces they are expected just to watch+listen as if it were indeed a regular 'concert'.

What I love about the medium is the fact that it can accommodate all of these modes. I've often referred to VRML as 'the mother of all file formats', and I think its true that the medium of Web3D could be called 'the mother of all media' because it is capable of an enormous range of usage.

Steve Guynup:

Still, I think music really opens up possibilities of collaboration (musician to musician / musician to audience) that have never been done before. Even though everything in a world is constructed by you. Even the users ability to produce content (even music is up to you. What notes can be played, What volume etc...)

So regardless of where they are in the world, they are looking at your creation. You control this. You control "what" they look at. They control "when" they look at it and this builds into what "order". Or when they play it, what "order" ;)

Barrie Collins:

What I am interested in is the idea that a software object can produce sound and image variations when interacted with. It also becomes more interesting if the object is complex enough in its

behaviour to produce large variability in sound and image display, such that it seems to be alive or volitional. To imitate nature, make things like leaves, insects, animals and attach sounds to them is an obvious course to take but to invent new associations of form/object/scene with sound or vice versa is another, or an obvious challenge with interactive screen art.

Sound can be very physical, as in a Buddhist chant, the sound is made deep in the chest in order to stimulate the heart. And with rock concerts, the base from the speakers really physically rocks your body. Silence can also be very disturbing and evocative - in space, they can't hear you scream.

Alan Sondheim:

This would of course depend on the definition of 'sound.' There are arguments that tone or colour, for example, depend on perception. Certainly, there are vibrations, but sound might be of another colour.

Is it music if it's unheard? Is it beautiful music if it's unheard? The phenomenology depends on the definition of these words, and their coupling to the observer.

Grégoire Zabe:

I just came back from a hike in Vosgian Mountains in east of France. And I couldn't refrain me from thinking about this. One of the problems with web - and especially web3D - art, is to become captive (in French that word is a synonym of fascinated...) of the strong "aura" of screens.

That trip in the mountains makes me think we are not so far from landscape architects. We have to install a globality, and then we have to think about human perception of it. Perhaps also we want to "see what is behind", like when you walk and pass through mountains. Not in that ideal of transparency that characterize 80's (a direct and frontal transparency) but in making the effort to discover "what is behind", giving time to think about what we are going to see, to hybridise times and imaginations.

Perhaps this is one definition of "media". Relay with delay between humans. And in this direction, landscape, urbanity, and art are one.

Christina McPhee:

I think this is the reason I got into net art in the first place, it is because of dreaming up what's 'behind' the screen, 'below' the screen...that's just what moves the whole thing, like to be able to move imaginatively through semi transparent layers, through meanings and motifs that are only partly clear, and remain mysterious and gestural, leading you on like Cocteau's torches in the long hallway as Beauty enters the castle of the Beast....

Melinda Rackham:

Yes, perhaps this is why we are all here.. it’s wanting to delve into one or several of those other dimensions, to make artifice.. to birth other lifeworlds..

re: the walking in the mountains.. I think I have said before that my best VRML experiences are always when I am snorkelling, the closest I get to immersive VR down there with the little fish. Electronic-nature, or nature-nature seem to be all the same thing really.. the hum of the water is soothing just like a hard drive... you are alone in you own envelope of soft squishy watery space and really alone even if others are there just like you VRML... carried along by the ebbs and flows, bathing in the sunlight of the datastream.

Alan Sondheim:

The nearest I've come is hiking through the Everglades - as a friend put it, you're in 'the zone.' And the dangers (snakes, alligators, poisonous plants, etc.) are obviously real. But the state of consciousness is, again, tacit; it's a form of heightened navigation in which you lose a certain degree of volition. Situationist derive comes to mind as well.

Many on-line spaces, it seems to me, involve moving in and out of this state as requirements and controls change. In some of the VRML readers I've used, I've "lost" the object or landscape for example, and have had to locate it, recentering or otherwise.

Ayoub Sarouphim:

This thread brings me to my area of interest. It involves covering ways of generating 3D environments fed by real-time data. Starting with a defined concept, I find it interesting to let worlds generate themselves with minimum intervention from my part . Lots of sensors are out there, Teleo with Max/Msp jitter might be a good choice. Parsing updatable data from the Internet is another option...choices are out there, and just as we are living organisms reacting to environmental changes, so could be the virtual environments we create...

Roya Jakoby:

Real time objects have aura. What about virtual objects?

Melinda Rackham:

How do you define aura, the invisible thing outside the skin of a human or object? Is it a material property? Is it a vibrational effect? or an electrical charge? Is it associated with commodity value, e.g. the aura of wealth?

Electronic works have all of these. They do generate their own charge, rhythm, glow, hype, uniqueness, value. The users are also uniquely generating a vibration or rhythm within them. Every user's keystroke or mouse rhythm is like a digital signature. Even as a list we have created our own flow and fluctuation this month so far. Generated our own life world data breath.

Simon Biggs:

Benjamin's notion of the aura was long ago shown to be not a function of the object but of its cultural relations and how these bear on the expectations and perceptions of the viewer/reader. Reading Benjamin now you can see that this was likely what he himself was trying to arrive at; but at that point the relativist cultural theory required to come to that position was not yet in place.

The aura is projected onto the object by the viewer, not the other way around; a bit like those early theories which had light and vision emanating from the eye, contrasting with current theories which have external light sources emanating light which is reflected off the object of vision to the eye (I often prefer the vagaries of the early theories).

Roya Jakoby:

The tradition of museum's and gallery culture as we know it today is founded in the exhibition of objects which were taken away from the various imperial colonies. Most of these objects had originally spiritual (cultural) meaning - I like to call this cultural meaning aura, because it is far more meaningful than 'value' in this particular context. The objects usually lost their 'aura' when they were exhibited outside the culture that originally produced it. The only thing that was left of it was some abstract notion of value for the exhibitors and those who viewed it. Museums try to restore the original

aura of objects constantly, they do this by various means, one of the methods is to add subjective and monetary value to the objects.

Simon Biggs:

Aura is projected by the viewer onto the object and that it is a culturally determined (and thus contingent) system of value. It doesn't matter what the origins of that value is, whether religious, ideological or aesthetic. It is also possible, even common, for objects existing within one culture and then shifted to another to still have an aura, but an aura determined according to different values. Thus we see the object change its value and meaning.

Roya Jakoby:

I'm not quite sure what aura means myself. Sometimes you encounter something and it feels like it has a very strong presence. So maybe it's better to call aura the atmosphere or presence of something. I personally prefer the word presence. You know it when you see it/experience it. Sure, there is also the physicality aspect (electro-magnetism) of all things, but that alone doesn't create a strong presence. It is an emotional, somewhat transcendent quality inherent in a being, an object, a piece of art (no matter what medium). Some people call it also the energy of something orcharisma.

Digital art facts have of course presence. Some have more of it, some have less. There are various parameters that determine such a presence, or the lack of it. I'm interested in those parameters.

Simon Biggs:

The aura is an article of faith, as these things often are. As Derrida points out, any text is only completely written when it has been read. Interpretation is half the writing process. Aura is a product of this final stage of production...it is in the remit of the reader, not the writer, to add this final layer of value to the work.

Melinda Rackham:

Pesce (co inventor of VRML with Tony Parisi), used to say that writing VRML was like being God...it was magical and invocational…and we all snickered…but when we as users inhabit those worlds we are in a sense inside a living pulsing organism.., bathing in its data flow, responding to its gravity. It might be computer generated but hey isn't our body just a vast amalgam of hardware colonies that runs materially embedded software programs allowing us to interface with the world outside our skin.

This brings me to the question of are 3D environments only alive when a user is in them? Do they have inherent qualities and fixed meanings, or is it like an elemental particle that can fit many different combinations? Do they become like a recessive gene when sitting on the server waiting for human presence to activate them.? Is it the passivity of the space (or the potential of the void) waiting for (hu)man to give it life?

Sue Thomas:

Melinda assumes that there are only two entities in the equation - the 3D environment and the human. But is that correct? Perhaps other things can act within the environment, nonhuman things, datathings, manifestations.

And perhaps those datathings could be linked to Roya's question - do virtual objects have aura? In so far as flesh objects have electromagnetic fields etc, perhaps virtual objects have that equivalent as well, and perhaps that 'aura' is the datathing I refer to above.

I guess what I am getting at in this

rather clunky and uninformed way is that the debate above seems to put the human at the centre as the most active and controlling entity. Perhaps this is a natural result of programmers / builders conversing, but I prefer to think that we have not built and we do not control every single thing in a virtual environment, but that we are simply seeding something which will itself evolve and mutate.

Regina Célia Pinto:

Well, would it not be just the definition of virtuality, the power of become? Do only 3D environments have this property? Are the characters of "Le rouge et le noir" alive in spite of 'nobody' to be reading the book? Or worse than that: even though nobody had read this Stendhal's book?

Melinda Rackham:

One of the things I love about the VRML programming language is that it never assumes whatever is interacting with it is human.. e.g. in the specification on VRML the user can be anything:
"3.108 user -A person or agent who uses and interacts with VRML files by means of a browser."
This led me to consider VRML worlds as a.life worlds, and avatars to be alive in the sense that they have unique relationships with users.

and r.e.: the power to become is perfect ... the more eastern philosophic understanding of the void is that it is pure potential. Virtuality and 3D still have moral implications in eastern philosophic systems like Buddhism, Confucianism, Taoism, and maybe Hinduism, as they do in the west (inferior, pretending, almost as good as, almost virtuous,) but it is reversed. In eastern thought material Reality is a false and deceitful thing and the only true reality is virtual reality i.e. that place we go to in meditation or trance.

Alan Sondheim:

Just wanted to disagree with the notion of our body amalgam. For one thing - the hardware is the software is the wetware is the mindware - for another there's no "x running y" - for another the "the world outside our skin" is also inside - interiors are highly problematic, given the nature of tacit knowledge and prostheses - and for another - I'm not sure what "hardware colonies" are - unless you're referencing something like Minsky's society of mind -

Finally - inhabitation occurs across all sorts of worlds, including that of the novel - which in an odd way is a lot more generative since words are only catalytic in the visual - 3D environments are not alive in any case. Human interaction does give them life for that matter, any more than rollerblades "come to life" when someone's out skating. It's a matter of function and reception.

Melinda Rackham:

It's the problem of definitions. Where do we split things up? I go to many talks where "leading scholars" happily talk about the real and the virtual like they exist in different universes. I get annoyed at that. But, then when I am trying to explain things its hard to say "well we are all just one big blob and there is no differentiation." I am you am everything. I agree that we don't end at the skin (that's a very Haraway Cyborgian construct isn't it!) but it's a very practical soft and permeable boundary to use. How would you differentiate human in interaction with technology?

Alan Sondheim:

I wouldn't. I'd differentiate among origins, those in relation to tissue, and those not. But not even that. We're

prosthetic from the origin itself. Culture and language are already prostheses.

→ metaphysics and technicalities

Jim Andrews:

Being able to see things from more than one perspective.
Becoming aware.
Being able to see things from a new point of view outside oneself.
The 3rd eye.
This is surely important to the attraction to 3D?

It's the metaphysical space that offers the possibility of new perspective. Art is invisible. 'Perspective' in a mainly figurative rather than literal sense. Whatever literal perspective we see from, we lack a new figurative perspective unless it is new in our metaphysical space. The 3rd eye is invisible, is figurative, sees the metaphysical space.

It's exciting to see VRML works like *Empyrean* creating a metaphysical space rather than a poor imitation of a physical one. And certainly, given contemporary homestyle computers a relatively low polygon count is important to a relatively large audience, for them to be able to experience the work with some fluidity, which I find an important factor in the experience.

I have heard at least one pronouncement of the "failure" and "death" of VRML, but it seemed rather premature to me. I have seen some fine work in VRML. I haven't seen any good VRML work that tried to create an imitation of a "real" space-- it seems important to explore metaphysical spaces, or as in some work I've seen, literary spaces etc.

Also, just because a technology has a relatively limited audience doesn't mean it's dead. If one wants to see the Mona Lisa or whatever work in a gallery one cares to name, you have to travel there, so the viewership is, again, limited. Which of course doesn't make it a failure.

Grégoire Zabe:

But we also have to remember that we are in the art of illusion. That is quite important in the fact that the position of user is sensibly different in 3D than in a "real" space... that 3rd eye is getting all his importance in that condition.

Adam Nash:

To me, all and any technology used for art is fundamentally in the service of the metaphysical expression. *Memory Plains Returning* is a personal reflection on a very painful journey I took over a number of years, and in its expression I hope as artist to tap into some commonality of experience amongst beholders - in this sense Web3D is no different from any other tool used in art, be it words or paint or photo-sensitive chemicals. But I do want to stress that, as much as I love Web3D as a medium, I don't think that the (literal) multiple viewpoints available menu-style to a Web3D beholder are anything other than a linear series of single point perspective views very analogous to edits in cinema. It's very telling that in many (but not all) 3D authoring programs these viewpoints are called cameras. You will never transcend the confines of the Cartesian perspective quite simply because the rendering paradigm of the software itself has been built from the ground up to strictly conform to those rules.

Steve Guynup:

I look at the VRML works produced today and see no difference to those made years ago, e.g. Maurice Clifford's 7 year old project *The Aleph*. In terms of art this is not a fair question. In terms of design it is critical.

We do not seem to be making real progress. Only the technology is

better. Deep questions of navigation, interaction, & presentation are unresolved. Frankly, has anyone ever seen a good study done of the web3D works produced in the past seven years? Something that looks beyond a single person and tries to compare and understand the vast array of work that's been done?

Laotzu:

The reality of the building doesn't consist in the four walls and roof but in the space within to be lived.

Roya Jakoby:

I'm part of the show but I can't view most of the works of my fellow participants because I neither have a PC, not mentioning the resources and all those exotic plug-ins I'm required to install (if I would have a PC). I personally find all these requirements for viewing very irritating and annoying. I personally prefer work that is accessible for the broader public and simple in its technical and ideological requirements. Where would all those 3D sculptures and landscapes take me if I could visit them all?

I surely don't question the need for art and in particular for digital and for 3D art. After all I am an artist myself. But as an artist I feel kind of frustrated not to be able to access various works, due to technical and financial limitations in equipment. I would love to experience all those 'big landscapes', but right now I just can't.

I believe that creating ones own world and vision is a good step towards good art. Never mind the tools/media you are using in order to get there. I'm in love with digital, in particular with the web. The web has always been good to me. My work is technically simple, though it has its technical limitations, too. I would like to do something technically more complex one day, but for now I feel okay with making the most out of the things I know and the tools I have.

Regina Célia Pinto:

To do a 3D work what is necessary is to have the feeling of 3D. If one have knowledge of Perspective and Descriptive Geometry it will be easier to create 3D forms.

It is interesting to say that we are not creating 3D. We are not able to do sculptures as Michelangelo did, with software, I think. *Régis Debray wrote that all image is a lie.* What we are doing are only simulations of 3D, as photography and some paintings - lies too . Turning to the beginning of the last century when we had lots of Art Movements which rejected perspective and launch abstract as Art because of the invention of the photography. It sounds like a good issue to be investigated. Are we going back to the past - before the invention of photography?

I think the important question is how to use "3D" to do works nowadays. What are the new ways to discover and follow? The ambience of electronic games is very interesting but is it really art? What is Art? What is the Art we are interested to do? It can include the return to the past...

John Klima:

Something I frequently find when presenting work to a broader audience is the reaction that it’s "all about the tech." If that were truly so, we would be here engaged in a discussion about how to better render water droplets, and techniques to get more angels dancing on the heads of pins.

What we all love about this medium is precisely that it *does* raise many many questions that have little to do with its implementation. That is what all good art does, from cave paintings to CAVE environments

Alan Sondheim

But a question here - when we're talking 3D in all of these cases, we're not talking about 3D environments - we're talking about flat display and 3D -> 2d projection. I think this makes an enormous difference - it's nowhere near any sort of virtual reality or realism, but is, in fact, the result of mediating projecting apparati. Now why this matters, perhaps, is that there are always issues of navigation if the work is interactive - and most of these I've found clumsy, not intuitive, and not in any way orienting the body towards the experience, since there's a learning curve obviously with either mouse or joystick (sometimes keyboard). Further, there are the usual issues of commercialism - my old VRML 1 something doesn't run anymore. How much is 3D work software-dependent and corporate-dependent for viewing?

Adam Nash:

I'm interested in the properties of the medium itself, not how it relates to 'reality'. Obviously I'm interested in how *people* relate to 'reality' and I prefer to use the medium for the unique properties that it displays.

I'm not really interested in orienting the body towards the experience - the body is sitting at a computer, so I don't see why it should be any more of an issue than any other computer-based art like Flash, or websites, or hyper-fiction, or QuickTime movies or anything. Certainly, if you don't know how to navigate the work using either the keyboard or mouse, then yes you'll have to learn, but isn't that like saying that a book is non-intuitive for someone who doesn't know how to read? It's a given. I wouldn't regard the mouse or the keyboard as intuitive - they are highly specific and learned. But, really, what does 'intuitive' mean anyway, surely it simply means something that you learned so long ago and so comprehensively that you no longer need to consciously think about it as you do it?

One of the major reasons why I have stuck with VRML (and will be sticking with X3D, which really is VRML3) is that it is an international standard, an ISO. This means that the technology itself is not owned by any corporation, it is available to anybody. As much as I respect and admire a lot of the work being done in Shockwave3D, I have an inherent distrust of closed, proprietary technologies, not only because I'm worried that Macromedia will suffer one of these currently popular corporate collapses, or be bought by Microsoft who will then shelve it, or whatever, but also because I simply don't want to depend on a corporation for survival.

Steve Guynup:

There are two actively supported VRML plug-ins
Cortona-

cts/
Contact-

d/index.html
they are not exactly interchangeable. Cortona has a Macintosh version (OS 9 & X) Contact is a little faster and allows for more, well, flexibility in multi-user sites. Cosmoplayer is dead. Bought and buried by Computer Associates. (CAI got the technology in their buyout of Platinum. The twist is that Platinum had fired the people working on Cosmoplayer and had planned to release it as open-source. So when CAI got it, they got the software and nobody to develop it. Enter Metacreations (formerly of Painter & Poser fame). Metacreations, fearing Cosmoplayer would be open sourced now by CAI, signed a deal with CAI: Forget Cosmoplayer and support us. Metacreations hasn't done very well.)

VRML is not hard, Shockwave3D is ok (and you like Macromedia products) If you like programming maybe the Unreal game engine. Atmospheres has been out for a couple of years and is still in Beta. It was an older technology bought by Adobe just prior to Macromedia releasing Director 8.5 (& Shockwave3D)

My personal take is that it was just a hedge by Adobe to blunt Macromedia's foray in 3D. It's not being pushed because Shockwave3D isn't doing particularly well either. Not because the technology is bad. (well, Lingo is nutty) but because issues of design and construction of 3D are difficult to resolve. Hence the large number of failed/failing web3D technologies.

Narvika Bovcon and Ales Vaupotic:

We would like to add a link to a paper that discusses the relationship between the space and time in contemporary philosophy. This is the conceptual background behind our VRML project *VideoSpace*. See especially the chapter "The specificity of the method (space and time)" that finds the particular features of contemporary methodology of humanities in the shift of interest from temporal to spatial relations.
http://www.kud-logos.si/LOGOS-3-02/bakhtinfoucault.htm
We are convinced that it is of utmost importance to discuss these matters today, especially because there is still so much non-acceptance and poor understanding of this field of contemporary art.

Adam Nash:

Tamiko would you feel like elucidating what properties you feel that 3D brings to the work? Whilst I've only seen the web version of your piece, I imagine it's the difference between 'experience' and 'being told'? Whilst I note that you use the term 'virtual reality', I don't imagine that your aim is for the beholders to actually think they are experiencing it, rather to provide a deeper, more experiential, insight into what it must have been like to experience that reality? I ask this because I am very interested in Web3D artists trying to develop an appropriate vocabulary, rather than one that is based on precedents (usually cinematic or early-90s hokum).

As an example, I love the idea of 'immersion', but recently this word has taken on a very narrow definition that means the kind of Imax or CAVE type environment that attempts an actual physical immersion, whereas (as much as I enjoy Imax movies) I find reading a novel to be far more immersive. Similarly, what is the verb that we use for beholding a Web3D piece? The verb 'seeing' is inadequate. Perhaps 'experiencing' is more appropriate. By identifying the qualities that set Web3D apart from Flash and other 2D tech's, perhaps we can start working towards an appropriate vocabulary.

Tamiko Thiel:

The full *Beyond Manzanar* piece is shown as a room installation, not as a web3D piece, partially because I really want the "immersive" effect that comes from having a life-sized image on a large screen. While the physical "immersion" is less that in a CAVE or HMD, I find the psychological/ perceptual immersion that this format produces to be substantial, as the kinaesthetic sense of the body reacts to the life-scale image in a way that it doesn't to an image on a desk monitor. I believe the type of immersion of attention that you speak about when reading a book comes only from compelling subject matter and/or presentation, and is independent of the medium itself. So perhaps we can talk about:
- full physical/perceptual immersion, where you can't see anything else,
- perceptual/kinaesthetic engagement, where you can see the rest of the

environment but the virtual image still affects your kinaesthetic senses,
- and a compelling artwork that holds your attention, as being 3 different meanings that people use for the word "immersion."

I do specifically use the word "experiential" for the sort of interactive, navigable 3D VR that *Beyond Manzanar* is, and think that "experiential virtual environments" is a good term to distinguish these non-competitive works from games such as Myst and its follow-ons, whose main point is the solving of a puzzle even though the process of solving the puzzle requires you to go use an experiential technique.

It was very important to me to implement *Beyond Manzanar* in interactive 3D because I wanted the user to develop their own personal relationship to the barracks, the barbed-wire fence, the landscape of Manzanar rather than think of it as the backdrop for someone else's story. I believe that this sense of "being there" is the experience that interactive 3D or virtual reality can provide that other media cannot.

Adam Nash:

I think you're right that the body reacts to a large image, but I still feel that it is the content of the artwork itself that defines whether the *experience* itself is an immersive one, a lasting one, a memory which transcends the physical situation of the beholding.

Do you mean to suggest, then, that a piece that lacks compelling subject matter will become compelling when presented in a physically immersive environment? Certainly these distinctions of immersive type experience are true when used to describe a physical situation, but I don't think that 'immersion' is achieved through any other means than the compelling artwork itself. I've had truly moving, memorable experiences (and yes, I'd call it immersive) looking at a 160x120 QuickTime window on my computer monitor, and have also been completely bored in an iMax theatre. When I think back on a novel I have read, I don't think of the physical situation I was in whilst reading (aside: reading is interesting because the beholding of a novel often takes place over temporally and spatially disparate situations), I enter the world in which the novel takes place. That, to me, is true immersion. Equally, when I remember the web excerpt of Beyond Manzanar, I am completely immersed within the environment of the prison camp itself - my computer monitor on my desk in my studio simply is not part of the memory.

There are two major negatives for me with the term Virtual Reality. One, until 'The Other 3 Senses' are virtualised, it needs to be called 'Virtual 2/5ths of Reality'. Two, the sheer amount of physical and financial hassle required to mount physically immersive environments. This is not to say that I have anything against such environments just that they don't appeal to my work method, which, being a performer and musician, is much more akin to using Web3D as if it were music, i.e., conceive of it, write it, perform it, keep it in the repertoire, move on to the next one. I like the idea of it being non-site specific and able to be beheld in a variety of situations, be it in someone's home, projected in a gallery, or at a live gig a la live music - which is something I'll be doing a lot more of now that I've built up a big enough repertoire of pieces to make up a good length 'set'.

Tamiko Thiel:

Beyond Manzanar was actually originally planned as an on-line multi-user piece, but I realized quite soon that having other avatars in the space mostly pulls your attention away from the rest of the content. Since I wanted the piece to be a contemplative experience between you and the

landscape, I decided it was better to make it an offline, solo, immersive experience rather than on-line and shared.

I think to make a successful multi-user work you really need to understand what "added value" is provided by other users in the space, and orient your piece towards this. In the best of circumstances the other users are an enrichment; all too often they are an annoying distraction, because they are there with some other agenda.

Adam Nash:

This is true of works that are conceived as single-user, and most art whether virtual or not, is indeed single-user, even if it takes place in front of a room full of people. As for on-line 3D works designed for multi-user, most of these until now have really been chat rooms with 3D graphics added on. In this case, the multi-user aspect is crucial but it is the 3D itself that is of questionable use.

I'm interested in the multi-user space as a live performance medium - whilst this is obviously not a new idea, not very much work has been done in that area. Something I quickly found to be problematic was the avatar-as-human idea. Trying to treat the space as if it were a regular physical space in which bodies perform introduces massive problems of two major types. First the time and effort required on the modelling and animation (with its attendant problem of large filesize), and second the audience expectation. It seemed natural to remove these problems completely, and use the space for its strengths rather than weaknesses. When trying to emulate physical space, the lack of gravity and economy of geometry is a weakness, but when the piece is abstract these qualities can be used as part of the performance.

It also leads to the questioning of what an avatar is. Again, analogy with physical space quickly falls apart. In the version of VNet that I have been using, switching to OOBE mode ("Out Of Body Experience", i.e., one can see one's own avatar from an objective perspective) causes some very interesting effects. Sure, you are looking at your representation in space, but if you move around whilst in this mode, your avatar does not, begging the question of which one is you - the avatar designated as you or the position from which you are looking at the space? There are many other capabilities that in physical space would be considered anomalies, but to me they all point to the conclusion that the virtual 3D space isn't really very similar to physical 3D space, and this is a very freeing realisation from a performative point of view.

In the multi-user version of *Memory Plains Returning*, that we performed during *Lab3D*, the avatars “become” the space, or at least their visual and sonic manifestation is so large that they seem to. The most common comment offered by audience members logging in at the start was that they couldn't see anything. This was the equivalent of an empty stage or a silent concert hall. The action doesn't start till the performers do. I conducted the performers, whose avatars were made up of different sections of the piece, to change the visual appearance at my command. In this way, they are not really avatars in the conventional sense at all, even though it is true that they represent the performers in that if the performer logged out, the avatar would not be there. It was a highly structured performance with little room for the performers to improvise.

The piece was also being projected onto a screen for the benefit of a live, physically present audience in Folly, and at Cornerhouse. This situation has some good and bad points. For the good, at Folly (from where I was logged in), I was 'presenting' the live

MOO performance which offered some difficult concepts for those new to the form and as a result we were able to have a very interesting discussion about the nature of the performance and the space itself. I think this medium, particularly in these early stages, can only benefit from its 'inner workings' being exposed to the audience, as the philosophy behind the performance has so much to do with those inner workings. I don't believe in the myth of 'suspension of disbelief' and I think the audience need to be included in the performance for it to be satisfying for them. Ideally we'll reach a stage when the audience already know what to do when they log in, but for the moment we will have to contend with a bit of teaching.

The on-line audience did seem quite content to sit back and enjoy the composition, and there were many who put up with crashing and logging back in again. This crashing seems to be a combination of the flakiness of VNet and the largish amount of geometry. Some interesting temporal effects were achieved by this re-logging in, where some members of the audience (and indeed the performers themselves) were seeing different things - again an 'anomaly' that can be used within the performance. All in all, what was supposed to be a highly composed and structured piece became quite chaotic in the on-line performance, and whilst I personally enjoyed that very much it was confusing to some audience members.

I think the 3D multi-user space offers a huge potential for live performance, and my current project "Scorched Happiness" is an attempt to really thoroughly investigate the medium's properties and create a performance, unique to it, that is as satisfying as a live performance in any other medium.

Biographies: artists and curators

Simon Biggs
Babel http://www.babel.uk.net
Simon Biggs was born in Australia, 1957, and moved to the UK in 1986. A visual and inter-disciplinary artist, he places the computer and interactive systems at the centre of a practice addressing issues around identity and reality as social constructs. His work has been shown at a number of major venues in countries including Australia, Austria, Bosnia, Brazil, Canada, China, Columbia, Croatia, Czech Republic, Finland, France, Germany, Greece, Holland, Hong Kong, Hungary, Italy, Japan, Latvia, Macao, Mexico, New Zealand, Norway, Poland, Portugal, Slovenia, South Korea, Spain, Sweden, Switzerland, UK and the USA. He is currently Professor of Research at Sheffield Hallam University, UK and Research Fellow at Cambridge University, UK.

Narvika Bovcon/Ales Vaupotic
VideoSpace http://black.fri.uni-lj.si/*VideoSpace*/
University of Ljubljana, Slovenia
(homepage:http://www.geocities.com/kino_log/)
Ales Vaupotic, born 1975, Ljubljana, Slovenia. Diploma in comparative literature at University of Ljubljana. Since 2001 graduate student of comparative literature at The Faculty of Arts in Ljubljana. Since 2002 graduate study of video and new media at The Academy of Fine Arts in Ljubljana.
Exhibitions: 6th and 8th International Festival of Computer Arts, Maribor, Slovenia. Aprilski susreti 2002, Belgrade, Yugoslavia. Biennale di Venezia, 2003.

Narvika Bovcon, born 1976, Nova Gorica, Slovenia. Diploma in graphic design at University of Ljubljana. Since 2001 graduate student of video and new media at The Academy of Fine Arts in Ljubljana. Exhibitions: 6th and 8th International Festival of Computer Arts, Maribor, Slovenia. Aprilski susreti 2002, Belgrade, Yugoslavia. Biennale di Venezia, 2003. Kudos Gallery, Sidney, Australia, 2000. Awards: Presernova nagrada, student award, 2000. Trnava International Poster Biennial, best student work, 2001

Stephen Guynup
The Crystal Cabinet http://www.pd.org/~thatguy/crystal
Steve Guynup is a "blue collar" Web3D developer. His work has been presented at SIGGRAPH's Web3D Round-Up in 1998, 99 & 2000, VRML99 & Web3D 2000, Museums on the Web 2003, WebX and many other conferences. In the mid 1990's he was a multimedia production artist who built multimillion dollar computer based training software for Fortune 500 companies. Seeking to understand the underlying philosophy that has been intuitively guiding his work, Steve has returned to academia and is currently pursing a PhD in Communications, The Moving Image at Georgia State University.

Kathy Rae Huffman
Director of Visual Arts at Cornerhouse, Manchester's leading centre for contemporary art, media and cinema, she curated *Lab3D* and is collaborator with *Web3D Ar*t. She was the director of Hull Time Based Arts, 2000-2002; Professor of Electronic Media Rensselaer Polytechnic Inst, Troy, NY, 1998-2000; and a networker, writer and freelance curator based in Austria from 1990-1998. She is a specialist for media art, web based initiatives, and a curator who pioneered support of artists work centered in media theory and practice. url http://www.faces-l.net

Roya Jakoby
Rise + Shine (splash) http://www.girlfish.net/motions/shine.html
Originally from Germany, Roya Jakoby is currently living between London and New York, where she runs a small new media arts & design company called Sweetdesign. Jakoby began working on-line in 1996, with a background based in writing, arts, design & on-line community work. She has been involved in new media work for the ZKM in Karlsruhe and for the Vitra Design Museum, as well as digital research and exhibition projects for Cambridge University Museums, England.

Patrick Keller
electroscape_001 http://www.electroscape.org/001
La_Fabrique10 http://wwwfabric.ch/La_Fabrique10/warning.html
Patrick Keller is an architect with a Masters in Computer Graphics and one of the founders of fabric | ch, a collective of architects and computer scientists that engage with experimental works (usually using digital medias) to formulate new states of existence for the architectural artefact in this contemporary space, i.e. that can exists on-line, in games, in new materiality's -electromagnetic waves-, distributed and variable, without physical materialities, etc.]. They define architecture as information [of a situation, + or -] and our works exists in various contexts like installations, on-line, in museums, for clients.

John Klima
Earth http://www.cityarts.com/earth/
Context Breederhttp://www.rhizome.org/Context_Breeder
Brooklyn-based artist John Klima (b. 1965) attempted to code a 3D maze on a TRS-80 with 4k RAM and failed miserably, but has been obsessed with 3D graphics ever since. His work has been included in VIPER, EMAF and SIGGRAPH; and shown at the ICC in Tokyo, and the 2002 Whitney Biennial. In 2002, he received a grant from the Langlois Foundation for his project Terrain Machine. Klima's work consistently connects the virtual to the real, addressing issues of remote responsibility, and blurring the distinctions between the simulated and the concrete.

Michael Arnold Mages
Mutual Assured Deconstruction http://www.du.edu/~marnoldm/MAD
University of Denver, USA.
Michael Arnold Mages is an artist, designer and composer. He currently teaches at the University of Denver in the Electronic Media Arts Design program. His works deal primarily with sound, economies of power, and perceptions of space. Michael is also an -empyre- moderator.

Przemyslaw Moskal/Edward Tang
3D Sound Sculpture http://www.antiexperience.com/3Dcubes
New York University, USA.
Przemyslaw Moskal graduated with Masters of Professional Studies from the Interactive Telecommunications Program at Tisch School of the Arts, New York University. Mr. Moskal is currently a multi-media freelancer and consultant for variety of commercial and non-profit projects. He also creates interactive, digital art forms, which are both screen based and installations. Mr. Moskal is a member on the board of directors of New York Dance & Arts Innovations, where he also curates interactive art exhibitions and creating digital content.

Edward Tang (BM, MPS) has a background in classical music performance and digital audio and has worked as a freelance audio/music editor for broadcast and new media in New York City. He has exhibited screen based and installation work in galleries and shows in France, England, and New York City.

Adam Nash
Memory Plains Returning
http://www.yamanakanash.net/3Dmusic/mprintro.html
Adam Nash is a programmer, composer and performer based in Melbourne, Australia, currently undertaking a Masters at Centre for Animation and Interactive Media at RMIT, researching 3D Multi-user Space as Performance Medium. He was invited to exhibit at FILE 2003, Sao Paulo, and has performed in Australia, as well as Singapore, Germany, Japan and the United Kingdom, with The Men Who Knew Too Much.

Taylor Nuttall
Director of Folly; a Media Arts Organisation based in Lancaster UK, he has been working as a new media artist exploring Internet technologies and virtual reality since 1995, showing work in VRML99 and 2000. Taylor has actively engaged in on-line discussion and collaborations including moderating the vr-art mailing list. Taylor has also helped to co-ordinate and judge the Eurographics Web3D Games competition. Folly has been developing a number of on-line and new media initiatives including Unencoded, Lancaster Film and New Media Festival, new commissions and residencies. During *Web3D Art* 2002 Folly hosted a live on-line chat to coincide with the ICA based exhibition. More recently Folly has been setting up a Linux based media lab called the Kitchen and hosting net art projects as part of edit / copy / paste. A new on-line monthly newsletter 'In The Kitchen' is about to be launched to promote new media networking and activities in the North West, UK region.

Melentie Pandilovski
is the Director of the Experimental Art Foundation in Adelaide, Australia. Born in Macedonia, Melentie was the Director of the Contemporary Art Center in Skopje for the last 4 years, and was the initiator and Director of the Skopje Electronic Arts Fair, the first media art manifestation in the Balkans. He also curated SEAFair 2001. The Experimental Art Foundation curates its exhibition program to represent new work that expands current debates and ideas in contemporary visual art. The EAF incorporates a gallery space, bookshop and artist's studios. url: http://eaf.asn.au/

Melinda Rackham
Empyrean http://www.subtle.net/*Empyrean*
Melinda Rackham is a net.artist and writer based in Australia, who has been working on-line since the mid 1990's constructing sensual hypertextual narratives and multi-user 3D immersive environments, and is currently completing a Ph.D. in Virtual Media. Her web works have been included in Art Entertainment Network, Beyond Interface, EMAF, Cybercultures, The Montreal and Buenos Aries Biennials, Transmediale, and ISEA. She received the Electronic Literature Prize at the Adelaide Festival, and the SoundSpace Award for Virtual Worlds at Stuttgart Filmwinter.

Anthony Rowe
altzero5 http://www.altzero.com
Ghosts (with by Gareth Bushell and James Lane) http://www.squidsoup.org/ghosts/
squidsoup is a loose federation of artists, musicians and interactive designers based in London. Their browser games, abstract virtual spaces, interactive music and installations have been shown at dozens of international galleries, festivals and events including ISEA (Nagoya 2002), SONAR (Barcelona, 2001), SIGGRAPH (LA

2001) and the ICA (London 2001,2002). Recognition includes an EMMA (Best On-line Art 2000) and a BAFTA nomination (Interactive Art 2002).altzero5 : *commissioned by Cornerhouse with funding from Arts Council of England*. *Lab3D* marks the launch of the work as an installation and event.

Ayoub Sarouphim
World 1 www.uweb.ucsb.edu/~ayoub/projects/world/world.html
University of California at Santa Barbara, USA/Lebanon
Ayoub Sarouphim (1974) 2001-present: University of California, Santa Barbara-Media Arts and Technology program-Visual and Spatial Arts emphasis.1994-2001: Bachelor of Architecture-Universite St Esprit, Kaslik-LebanonWinter/Spring 2003: Teaching Assistant - Professor Marcos Novak, Spring/ Fall 2002: Research Assistant - Professor George Legrady, 2002: Summer Internship at Lewis.Tsurumaki.Lewis, NY

Tamiko Thiel
Beyond Manzanar http://mission.base.com/manzanar
Tamiko Thiel's first VR work was as creative director and producer of Starbright World, an award-winning virtual playspace for seriously ill children commissioned by Starbright Foundation chairman Steven Spielberg. Her VR piece *Beyond Manzanar* addresses media scapegoating of immigrants groups seen as the "face of the enemy" and is in the permanent collection of the San Jose Museum of Art. In summer 2003 she will be in residency at the Kyoto Art Center on a Japan Foundation fellowship researching her next piece, The Travels of Mariko Horo and in 2004 will be a Fellow at the MIT Center for Advanced Visual Studies in Boston.

Grégoire Zabé (with Regis Albignac)
Inframonde - a participative landscape http://www.inframonde.net
Grégoire Zabé is a designer and artist, teaching at école supérieure des arts décoratifs de Strasbourg. He is part of group of artists "ESP" [www.eternalnetwork.org/esp] , travelling around "telepresence" thematics, and worked with Eleanor Hellio, on some works "animachina, food him with network flows" and "eleo" an autonomous puppet [www.nobox-lab.com]. “Trans-portrait" a recent work on figure and media, has been selected on incident.net. Recently Grégoire has been participating in the Norapolis conference with Fred Forest, Jules Maeght and Olivier Auber about hybridation of design/art/Internet and about economical issues of web art, and has presented "transports” at the "alternative workshop" in Strasbourg.

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Melinda Rackham
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http://www.asondheim.org

Lab3D List of works

squidsoup
Alterzo5, 2002/3
with sound by Icarus
Virtual space with sound objects
Commissioned by Cornerhouse with funding from the Arts Council of England.
http://www.squidsoup.org

Tamiko Thiel and Zara Houshmand
Beyond Manzanar, 2000
Interactive virtual reality installation
http://www.mission.base.com/manzanar

John Klima
Earth, 2001
Software
Courtesy of Postmasters Gallery, New York
http://www.cityarts.con/earth/

Melinda Rackham
Empyrean, 2000/3
VRML (Virtual Reality Modelling Language)
http://www.subtle.net/*Empyrean*

Michael Pinsky
In Transit, 2002
Software developed in collaboration with V2 Institute for Unstable Media in Rotterdam
http://www.michaelpinsky.com/

Feng Mengbo
Q4U, 2000/2
Interactive installation/performance in Quake
http://www.mengbo.com/

Web3D Art

Professor Karel Dudesek, Ravensbourne College of Design and Communication and Kathy Rae Huffman, Cornerhouse, orgainsers.
Jury for the 2003 selection: Arghyro Paouri, multi-media artist, INRIA, France; Masaki Fujihata, artist, and professor at the National University of Art and Music, Tokyo, Japan; Tom Holley, Creative Director, The Media Centre Huddersfield, UK.

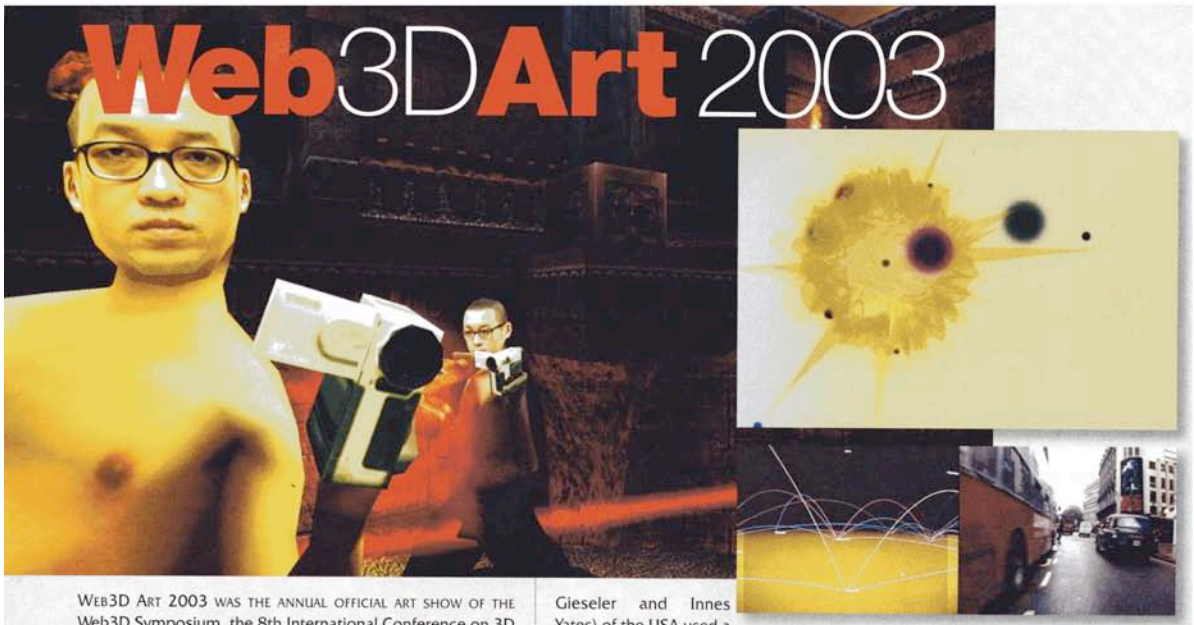
Special thanks to: Christian Bouville, Jaewook Shin, Adam Margerison, Deyan Raykov, Martin Schmitz, Melentie Pandilovski, Taylor Nuttell, Lina Russell, Tom Holley and Gill Howarth.

Web3D Art 2003 is authorised and supported by the *Web3D* Consortium, and ACM. Funded by North West Arts, Arts Council of England, Association of Greater Manchester Authorities, Manchester City Council, North West Vision.

Selections archived at:
http://Web3dart.org

Artists in 2003:
Michael Atavar (UK); Ricardo Barreto (Brazil); Stéphane Beugnet (Luxembourg); Simon Biggs (UK); Narvika Bovcon/Ales Vaupotie (Slovenia); Daniel Fischer, Tamiko Thiel and Peter Graf (Germany); Stephen Guynup (USA); Roya Jakoby (USA); Rufus Kahler (UK); Yael Kanarek and Bnode (Judith Gieseler / Innes Yates) (USA); Yasileois Karageorgos (UK); Patrick Keller -–Fabric | ch (Switzerland); John Klima (USA); Matthew Lewis (USA); Michael Arnold Mages (USA); Przemyslaw Moskol (USA); Adam Nash (Australia); Anthony Rowe, Gareth Bushell and James Lane (UK); Ayoub Sarouphim (Lebanon/USA); Jaewook Shin (Korea) with Marcus Quarta, George Tang, and Teng Chue Swee; Raphaël Vandendriessche (France); Jane Veeder (USA); Grace Weir, Juiha Huuskonen (Ireland); Grégoire Zabé/Regis Albignac (France).

Web3D Art 2003



WEB3D ART 2003 WAS THE ANNUAL OFFICIAL ART SHOW OF THE Web3D Symposium, the 8th International Conference on 3D Web Technology. Sponsored by ACM SIGGRAPH and the WEB3D Consortium, and held in March in St. Marlo, France, the symposium is the premier international event for the Web3D community.

Web3D Art is the only international, juried competition for on-line 3D artwork, and this year featured 25 works from artists in 10 different countries. Reflecting the somewhat disparate nature of contemporary Web 3D technology, the works were presented in a range of different formats: Cortona, Blaxxun, EON, Axel, Shockwave, Viewpoint, Cult3D and Java.

Cortona and Blaxxun are VRML plug-ins, while the others are plug-ins for viewing proprietary 3D formats. As usual, the majority of work was presented in VRML, showing that while Americans may consider it a dead format, the rest of the world continues to use it.

This year, however, Shockwave3D gave VRML a run for its money in the popularity stakes, which is probably a reflection of the lack of decent visual authoring tools available specifically for VRML.

The works in Web3D Art 2003 ranged from the purely artistic to more functional information visualisation apps. Babel by English artist/researcher Simon Biggs was initially commissioned by Focapoint Gallery in Essex, along with several local libraries. Using the properties of the Dewey decimal system (that each area of knowledge can be defined as a number and that the space between each numbered area is infinitely divisible) Biggs created a navigable, multi-user 3D space using Shockwave3D.

Anthony Rowe, also from UK, used Blaxxun's proprietary extensions to VRML to create 'Ghosts', a multi-user work where text comments left by visitors to the site create the 3D geometry in real time.

French artists Grégoire Zabé and Regis Albignac also used Blaxxun (with an alternate version tailored to the Mac version of Cortona – one of the few works to cater specifically to Mac users) to create a tunnel-world consisting of images uploaded by users.

A collaboration between Yael Kanarek and bnode (Judith Gieseler and Innes Yates) of the USA used a combination of Cult3D and Flash5 to produce the moodRingBaby, a fictional toy found on another planet.

Lab3D

PRESENTED IN ASSOCIATION WITH WEB3D ART, LAB3D WAS AN exhibition based at the Cornerhouse Gallery in Manchester, UK, with several other galleries participating in online exhibitions and collaborations.

Lab3D featured several interactive installations using 3D in various ways.

Most of the works were selected from Web3D Art 2002, including Australian Melinda Rackham's Empyrean, an abstract multi-user world realised in VRML, along with VNet, an open source VRML/Java client/server system. Also presented was the Chinese artist Feng Mengbo's Q4U, a modified version of Quake networked between three of the galleries, where all the of the players become Feng Mengbo, complete with naked torso and Handicam.

In Transit by Michael Pinsky (UK) was a fascinating cross between artwork and travel guide. Using proprietary technology developed in conjunction with V2 in Holland, the work uses a combination of video, 3D graphics and text to map out journeys between any two points in London in real time using your choice of transport mode (walking, car, bus, train or bicycle). The video window shows a "traveller's-eye view" of the actual journey, while the 3D window maps out the journey in spatial terms.

Specially commissioned by Lab3D, UK's SquidSoup produced AltZero, an immersive visual sound sculpture and software tool for producing 3D spatialised sonic environments. The tool is available for download from the AltZero website, www.altzero.com

Web3D Art and Lab3D were testament to the fact that, despite setbacks over the years and a very slow uptake by the general public, Web-based 3D continues to grow in popularity and interest around the world.

With the official adoption of X3D (basically VRML version 3) by the International Standards Organisation expected within the next few months, next year's Web3D Art should be more interesting than ever. ■

www.web3dart.org

[MAIN PICTURE] Feng Menbo's Q4U used a modified Quake to make all online players become the artist, half naked and carrying a Handicam. [INSETS, TOP TO BOTTOM] AltZero by UK's SquidSoup is a combination artwork and downloadable software tool for creating 3D audio environments; Michael Pinsky's In Transit used proprietary software to produce an interesting cross between spatial visualisation and real time travel guide; Memory Plains Returning (by Adam Nash) was presented both as a single-user work, and as a live online multi-user performance piece. It used straight VRML for the single-user version presented at Web3D Art, and also used VNet to realise a multi-user version that was performed live online as part of Lab3D, with performers in Lancaster, Manchester, Bristol and Melbourne; Lab3D offered a rare chance to experience Beyond Manzanar, an immersive documentary about Japanese American internment camps.

Content.net, August Issue, Page 35 (article by Adam Nash)

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