The COSTART Artist and Technologists

COSTART Artists: Adriano Abbado, Kirsty Beilharz, David Corbett, Gina Czarnecki, Pip Greasley, Sarah Minney, Jack Ox, George Saxon, Yasunao Tone, Ray Ward

COSTART Team: Ernest Edmonds, Linda Candy Mark Fell, Raymond Fong, Ingrid Holt, Roger Knott, Colin Machin, Sandra Pauletto, Manu Uniyal, Alastair Weakley

Collaboration involves multi-disciplinary teamwork and this has implications for the creative process. In June and July of 2002, a group of people came together under the auspices of the COSTART research project to take part in a series of artist-in-residencies. From the collaborative projects that took place new approaches to technology-based art emerged. In parallel research into the process was carried out and is ongoing. In this paper, the people who conceived the ideas and made the art forms and systems give their own accounts of what happened. The artists came from far-flung locations: Sydney, New York, Milan and many parts of the UK. The works created in their residencies were shown at the Creativity and Cognition Exhibition, Loughborough University in 2002.

THE COSTART RESIDENCIES

The artists’ residencies led to many interesting outcomes and are discussed in the following sections by both artists and technologists. A number of artists are concerned with developing real-time interactive works and audience participation. Participant learning and responsiveness were also important elements. Some projects examined the correspondences between sound and image whilst others concentrated on the interaction possibilities of sensor systems. Each project provided different challenges for both the technical requirements and the artistic intentions.

Adriano Abbado’s interests are in audiovisual abstract expression. The initial focus for his residency was to examine the manipulation of aural and visual objects in real-time, with a specific interest in the correspondence between them. During the residency, he turned his attention to the potential of the interactive techniques introduced by his collaborator, Sandra Pauletto. The work in progress will explore the sound visual relationships with sensor devices that enable a different kind of interactive experience from his previous works.

Kirsty Beilharz was keen to venture into new modes of interaction. Her interests lie in exploring the responses to curious engagement and enticing audience participation. The aim of the work is to create an interactive collaboration between those in the gallery space and those participating online. The work shown is a composition which presents the listener/viewer with an insight into the artist as a spectator. The experience is of contradiction, inner turmoil and conflict.

Interaction is also a key element in the project by David Corbett, but in sound rather than vision. His objective is to create a composition of percussion and orchestral samples which can be executed in real-time by several participants across the Internet. Using the work as a score they interact on-line to generate a collaborative live performance.

Gina Czarnecki is deeply engaged in exploring the possibilities of audience interaction in a process modeled on biological evolution. Using images of people, the aim is to create real-time interaction between image sequences and sounds in order to generate new forms and sounds. The next generation of images is created by the audience selecting those images by means of interaction. The outcome is a work that challenges the audience to co-operate in selecting for breeding whilst embracing the question of willingness to participate in the possibilities highlighted.

Pip Greasley’s long-standing interest in transformation involves the exploration of a universal interface that enables one cultural stereotype to communicate with another through a common language of music. Pip aims to create an interface of musical language that can manipulate the sound in real-time transforming it from one culture to another whilst maintaining its basic meaning. In the residency, Pip and Sandra decided to focus on a particular aspect of this project: the intermediate abstract language (i.e. the interface). In the exhibition, the resulting explorations are illustrated.

Sarah Minney’s residency was different to the others in that she has spent several months at C&CRS developing her work with the assistance of Sandra Pauletto and Raymond Fong. The Hand Held Best Friend (HHBF) is a small digital personality that can be mounted on a Personal Digital Assistant (PDA). It will eventually have the capacity to make contact with its “owner” through a mobile communication system. Viewers will be able to experience the concept through the selection of and listening to stories at the heart of the HHBF.

Jack Ox came from New York to extend her work in the correspondence between visual and musical languages. Described as a form of “translation”, she determines the structural parameters of a piece of music through encoded MIDI files in the ‘The 21st Century Color Organ’, which creates visual representations. The viewer is able to move through the space in the virtual environment, interacting with the sculpture and hearing its associated sounds. For the residency her aim was a three-dimensional representation of a musical score using modelling software such as Cinema 4D and 3D Studio Max aided by Manu Uniyal and Mark Fell.

George Saxon works with expanded notions of cinema to challenge conventional boundaries. He and Mark Fell decided to create a collaborative work that integrated live and pre-recorded material enabling real-time interaction. He proposed a number of explorations for the residency all concerned with interaction between the viewer and the work. The end result is a display of live camera input combined with recordings of earlier input so that people see themselves and others moving around the space by way of large video projections.

Yasunao Tone, winner of the Ars Electronica Golden Nica prize for 2002, has been working with the conversion of calligraphic drawings into sound. The process for doing this is time-consuming and such time delay restricts the use of real-time interaction. The aim for the project was to explore the possibilities of sound representation in real-time. The Soft-Board made it possible to do live performance in which, instead of having to transform the text into images with pictogram-like Chinese characters, the artist draws calligraphy on the board and transforms any text into sound. A video of a performance by Tone will be shown.

Ray Ward’s project is concerned with the development of a drawing machine which can be used in performance to create a visual image. Initially it was thought the input would be made through keyboard which unveiled layers of a drawing as it interacted with the program. Ray and Alastair Weakley, his collaborator, assessed various methods for sensing movement. By the end of the week, they concluded that in order to meet Ray’s particular requirements for portability and flexibility, it would be necessary to create their own system in the future.
Variety is among the most important things in life. It is through variety and selection that Nature can probably preserve and improve species. The process of categorization has been at the centre of my interest for many years. I faced the issue when, once creating many synthetic sounds, I had to sort them perceptually to organize my work. Several research studies have been conducted in this sense in the field of computer music. They have shed some light onto the perceptual aspects of synthetic sounds. However, much still has to be understood.

Only a few months ago I finally realized that the process of categorization is not tied to language, which was one of my unresolved questions. On the contrary, categories are most probably arising as soon as a newborn being gets in touch with the external world. In my thesis ‘Perceptual Correspondences of Abstract Animation and Synthetic Sound’, I explored different associations between aural and visual events. I subsequently defined four categories of correspondence: intensity, position, synchronicity, and timbre/visual appearance (shape, color, texture). The latter category is by far the most controversial and the most difficult to define. I am currently working on a new approach, based on neural networks. However, one of the correspondences that I find easier to set is the one between visual and aural noise. The concept of noise has interested me for a long time: I like the idea of emissive and absorbent objects: light and sound sources, on one hand, and filters on the other. Combining the two things is straightforward: filtered noise.

I went to Loughborough in July 2002 with the idea of creating a new audiovisual piece about noise (see Figure 1) The kind of equipment and the knowledge I found there quickly made me think it was worth turning the piece into an interactive installation: an interesting challenge for me. Of course there are countless ways to interact with such a rich audiovisual environment. In this case, the piece is composed of several predefined sequences, in a preordered manner. However, instead of dealing with parameters such as pitch, hue, or dimension, the user is concentrated into controlling the flow of audiovisual events. In other words, the focus is on macrostructures instead of single events: the coupling of audio with video. Creating an audiovisual piece is always a confrontation with a new language. And it is therefore more interesting for me is to see what sort of balance between the two signals and between sources and filters a user can define.

Figure 1 Noise, Cinema 4D, 12/07/02

While researching digital art works that focus on the relationship between sound and images, I had already looked into Adriano Abbado’s artist and academic work before I met him. Adriano’s approach to audiovisual works is very clear and well justified. He is interested in the relationship between aural and visual perception. In his pieces, abstract sounds are translated into visual objects following a system of correspondences between aural and visual perceptual parameters. He defined this system of correspondences during his studies at MIT.

I was curious to meet Adriano and see his way of working, but I was also uncertain as to what we could offer him at the Creativity and Cognition Studios unless he was prepared to diverge from his existing way of working. I knew from his latest work shown on his web site, that he had started to insert elements of interaction into his pieces, and I therefore suggested to him that he could use the interaction equipment in the Studios. Initially, Adriano didn't seem very convinced about using new software and technologies, mainly because of the time scale of the residency. For this reason we started working on an animation with abstract sounds and 3D objects.

I had prepared some sounds using the Csound and Audiosculpt software and Adriano was going to "translate" them into visual objects. The first sound Adriano decided to visualise was a sound of noise. While he was busy working with Cinema 4D, I kept thinking that this week could have been a great opportunity to do an interactive work, because the technology and the expertise was there to make it happen. I decided to show Adriano all the equipment we had on hand (e.g. the Max/MSP software for real-time interaction and the sensors). Before long, he had changed his mind: he was going to produce an interactive piece. He decided also to concentrate on aural and visual noise and their modification using filters. My role, from this point onwards, has been making sure that the technology for the interaction was working properly, while Adriano organised the sound and visual sequences. In the end, this residency has been very productive: Adriano was able to expand his ideas of sound and image relationship and interactivity using software and technology that he knew, but had not had the opportunity to use until now.

Figure 2 Pauletto and Abbado in discussion, July 2002
Floriferous: Kirsty Beilharz

The multimedia composition, Floriferous, is an assemblage of recorded piano music from Floriferous Rage (2000), a piece that explores issues that challenge the traditional functions of a passive multimedia experience. This composition is concerned with pacing of images and tempo of movement, framing and perception, and aims to project the listener/viewer into the brain-space of artist voyeur, experiencing contradiction, inner turmoil and conflict. The role of music in TV, cinema and most multimedia is subordinate and incidental, whereas here, that position is reversed, or at least, questioned. Expectations, in terms of colour perception, juxtaposition, sequence, logical progression, tempo and ‘niceness’ are challenged. The subject matter is a homage to the artist, Derek Jarman (1942 - 1994): painter, filmmaker, writer, designer. Jarman worked in a bewildering variety of media. In a flow of consciousness, expressed in the textual elements of the multimedia, the listener/viewer is invited into his world. Jarman explored gardens, their many incarnations, holding obvious musical potential for allusion and metaphor, interpolated through the piano. Floriferous explores musical gardens and, in doing so, occupies a musical world rich in diverse and varied gardens.

Floriferous Rage is an example of non-interactive or passive experiential multimedia in which the viewer/listener is invited into another world. The work that I developed during the COSTART artist-in-residence program in collaboration with Mark Fell was a new development because it hinges on user interaction and movement in a space and its mobility is largely determined by the gallery and Internet experience. I felt it was a very helpful progression to explore a much greater degree of audience interaction and to collaborate during the formative stages of this ongoing work. Issues of great interest that arose during our collaborative residency concerned the synergy of bringing together different artistic and technical backgrounds and the designing (and technical) challenge of integrating different forms of user interaction. The COSTART work aims to form an interaction and collaboration between participants in an online environment and those moving in physical (real) space in a gallery installation. Necessarily, this also requires technical rendering of images and sound in real time. The beauty of this development is that is constantly changing and unpredictable and it revolves around outcomes determined by participants rather than those predetermined by the artist. I am motivated to explore art forms that integrate different types of human interaction and novel interaction between virtual and physical space. The product of the COSTART project remains work in progress. The experience has propelled me into exploration of real time and collaborative work beyond the very determined, finite experience of previous installations. In Floriferous Rage, I hope the audience will explore the layers of imagery and meaning using imagination to re-examine ‘normal’ events and ‘normal’ objects that can adopt meaning and significance when juxtaposed in bizarre ways. This work is concerned with the distorted perceptions of an artist’s eye and with exploring the inversion of traditional hierarchies attributed to sound and images. In this work, sound event cues trigger visual events rather than accompany them in the way we are used to.

With regard to the COSTART collaboration, this experience is ongoing and continues to fuel my future projects exploring the bond between virtual and physical spaces and human interactivity. I am interested in the learning and collaborative connections formed between users separated by space but unified by time and shared experience.

Figure 3 Image from Floriferous 2002

Viewpoint: Mark Fell

In advance of working with Kirsty I knew little about her work. She explained prior to her visit that she wanted to explore ‘modes of interaction’ but in terms of how this translated into a work, this was left open. My role was one of support but, I was also involved in developing the work, not just its technical features. The development process clearly evolved into different stages. At first there was an attempt on my part to come to an understanding of Kirsty’s work and ideas. I felt that the point of this was not necessarily to establish some artistic ‘common ground’ but instead to start to think and approach making the work in ways that Kirsty would feel comfortable with. After this first stage we had assembled a loose collection of ideas that we wanted to explore. The second stage in development was to look at technologies. This included interactive technologies: web based ‘remote’ interaction, real time video and sound manipulation. We looked at each of these in isolation, to see what each component could do. Then we asked questions about how these could integrate into a larger system. For example, how could interactive systems control video manipulation in real time, or how could remote web based interaction integrate with the system? At this point we were still talking hypothetically without any firm conception of what the work would be. At the end of this process I felt that we needed time to let the possibilities of this system suggest things to us. The third stage was an integration of what we had discovered so far. Yet at this stage, there were some problems in deciding exactly what to do with the system, how to take all of these disconnected ideas, technologies and systems in other words and make a work out of them. I think that perhaps the process of working together itself contributed to these problems. The way that technical or creative issues were addressed in isolation from one another could perhaps have lead to a polarization of issues, ideas and technologies, or at the very least, presented unnecessary problems. I think this situation is a common one in digital art practice. However, as the residency progressed the work we made brought these two parallel strands together.
A Generative Improvisation Environment: David Corbett

I began working with generative designs for sonic and visual compositions to cope with being indecisive and slightly autistic. This reduced the risk of ill informed aesthetic judgments in live situations. I considered the scores and rules for the compositions as works in themselves, inspired by the likes of Cornelius Cardew’s Scratch Orchestra and the work of Fluxus. A piece created for the Lovebytes 2001 festival embodied these ideas using probability as the sequential score for an analogous film of speech. This work would produce questions, answers, declarations and ambiguities. My project for COSTART is an extension of these ideas. This piece focuses more on an interactive element with the score as a modular system that can be affected by audience involvement. The inspiration for the work came after viewing a demonstration given by Alastair Weakley of an online scrapbook to update the users’ actions on the web page. I began to envisage an online improvisation environment where several people could see and hear each other’s movements as they happened.

Working with Alastair, the idea began to take shape as we discussed design methods. The idea has changed design method several times, from the original concept which was to use the Max/MSP software and stream the output across the Internet. After some discussion, we decided on a design for the work. The web page is constructed using a combination of Macromedia Director and the Koan music generation system using Java script to connect the two. The source of the sound is created using Koan and then embedded into the web page with changeable parameters. When a graphic is moved, a Java script message is sent to the Koan code altering the sound parameters. All this information is sent to a multi-user server which updates and returns the changed information to other users. Speaking to Yasunao Tone and Mark Fell during the residency gave me alternative views on technical and conceptual elements in this work, Yasunao’s own work and his involvement with Fluxus gave an invaluable perspective. To date Alastair and I are still developing the piece, I am concentrating on Koan and Alastair is working on the interface and server using Director and Java script. I wanted to create an environment that invites more sonically creative interactivity. Initially I envisaged that the majority of this work would be working with and around the Java and PHP languages, something I am keen to be involved in and contributing to. I would use a variation on the idea of Max/MSP’s waveform editor as the interface which may involve a crossover of the C/C+ language. For the exhibition although web based I view this work as a score and aim for a collaborative live performance with several other artists interacting over the Internet.

View Point: Alastair Weakley

During our early discussions, Dave was interested in allowing a number of people to connect to a website and for each of them to be able to influence the sound that they all heard. Initially, I spent some time looking at streaming generated sounds, perhaps via our Quicktime streaming server. The suggestion was that the sound would be generated using Max and streamed to the server from where it would be sent to all the users simultaneously. My proposal was that the users, although they might not realize it, would be repeatedly submitting form data from their website and this data would be sent as a series of instructions to Max which would in turn change the sound output.

There were a number of problems with this approach, not least the fact that I was unable to send sound data from Max to the server. I even went so far as to connect a loop of wire from the headphone to the microphone socket of my computer and then tried to read this input and send it to the server, but to no avail. It was only fairly late in the preparation process that I discovered the Shockwave Multi-user Server. Using this program it is possible to create chat rooms or shared whiteboards whose users can all see what is happening in something like real-time. When Dave arrived for his residency, I was still not sure whether he wanted the system to trigger the playing of sound files which would have to be downloaded to the client machine or whether he would really like the sounds to be generated on the client machine. We decided that he should start by investigating the software Koan which can be used to generate sounds in websites. My job was to prepare a Macromedia Director movie which could transmit and receive instructions to and from the current users of the system and then use these instructions to control the sound being generated locally on the users’ machines by the Koan plug-in.

It was interesting to see Dave’s ideas develop throughout the week; we were working on separate aspects of the project, but in the same room and were able to exchange ideas easily. Although the work was not completed by the end of the week, we had many interesting discussions and I felt that I was able to contribute as a partner in the process rather than merely a facilitator. We both ended up with a clear idea of what he wanted and Dave at one point even mentioned a series of works of which this might only be the first. I think this is a good indicator of success in collaborations of this type: the work we did and the things we discussed were sufficiently interesting for Dave to want to pursue them beyond this initial project and I am delighted that I could contribute in some way.
Interactive Evolution: Gina Czarnecki

My work is concerned with the evolution of realistic imagery from live and video source material using paradigms of biological evolution. Working with the body and sequences of movement and sound to create real-time interactive experience, new sequences, forms and sounds are evolved. The work being explored in the COSTART workshop was related to piece already in the initial stages of production, ‘Silvers Alter’. This piece is a development from ‘Stages Elements Humans’, a video installation commissioned for the Year of Photography and Electronic Image, 1998. It is based on issues surrounding genetic engineering and related scientific, technological and ethical concerns. It is an experimental observation of the development of consciousness and science. It raises a simple question: to what extent are we prepared to participate in all that we have made possible and that we aspire to make possible for ourselves? It gives the audience the power to create, eliminate and stare.

I wanted this piece to present a exploration of socio-political concerns, technology and art through a multi-user interface that incorporated generative programming to evolve new forms and not limit the interactivity with technology to a pre-determined set of choices. I wanted to enable this further evolution of creative artefacts (image, text, sound and information) using “real-time” interactivity. I wanted this interactivity to be primarily between members of the audience rather than being between the individual and the technology, and give them the power to determine the way in which the population (on screen) evolved. I was interested in the way people make choices, when you can distinguish individuals from a crowd, when data becomes information becomes knowledge.

Figure 5 Image from Interactive Evolution, July, 2002

The subjects filmed prior to coming on the COSTART workshop all provided body samples for electron photography and buccal swab tests for DNA analysis for colour-blindness. This is one of the only traits that is “over 90% genetically determined” and does not present the participants with new or highly sensitive information. The installation takes the form of a large back projection screen on which the human forms ‘live’. These figures are changed by the audience’s presence and movements in the space. After researching different devices for triggering audience movement, weight and accumulation in the space, it was decided that floor pressure-sensor mats were the best solution for non-permanent exhibition in this instance. We did not get round to implementing this but the theory worked. We spent much time in discussion about the generative possibilities for realistic images. I knew that this would prove the most difficult aspect of the project although some software is under development that recognizes 2D video images and can re-construct new images from these. The choice was to either go with collages of the 22 people recomposed into new forms- but this looked too simplistic; the other choice was to use 3D objects to map these images onto the computer and reconstruct new from this information/3D plotting. I could find it in myself to compromise on most things but not on the aesthetics of the piece. So neither option was suitable. I wanted to maintain the politics of the space in that the interaction between people within it was fundamental to how they engage with the technology and the ideas. To control the space people have to work together and to be so physically close to one another that they touch. The team suggested that instead of the audience selecting two figures independently before a third could form, they selected one and there was a constant ‘last-born’. In order to change the evolution of the population this would then compromise the generational simplicity, but the interface would be far simpler, more obvious to understand for the audience whilst maintaining integrity of the ideas and the parallel interactivity of many people in the space. Whilst this idea seems appropriate - it has ramifications for other aspects of the work that need more consideration. It was useful to engage at this level - not only with people who are technically knowledgeable but who have practical experience of audience interaction and engagement with interactive works.

Viewpoint: Mark Fell

I had met Gina once or twice at openings of exhibitions but had never worked with her. From what knew of her work and through mutual friends and acquaintances I had built up a picture of her concerns as an artist. Gina came with a clearly defined set of ideas and concepts concerning the political and moral implications of genetic research. These issues ran throughout her work. Prior to the residency Gina had been developing a rough scheme for a video installation whereby people were able to select and evolve a virtual population. The work developed into a specification that described what it did, and how the participant would engage with it. However this description was developed bearing in mind some of the possibilities of available technologies, so during this process, technical, creative and ideological issues were being dealt with in parallel. Here there were some clear trade-offs; for example between what the systems could handle in real time, and image quality. However these technical issues did not impede the development of the work. Once the work was started Gina was present and often ideas were tried and developed that in some way changed the emphasis of the work. On other occasions we worked in isolation on different tasks. Throughout the process it was clear that some decisions should be taken jointly, or individually. And in some cases I felt it was not appropriate for me to comment. Generally speaking, we worked very well together. I think we understood each other’s positions well. I think my background as an artist helped the development process as we were coming from some kind of shared background.
Cultural mismatch has almost become a sunrise industry in the western world. The global village, which was once to be a panacea for a more liberated, enlightened and enriched exchange between peoples, has been stymied by a straight jacket that superimposes a form of homogenous communication protocol on all cultures. Our technological blueprint should be looking to foster inclusivity and not alienation. It is no wonder that beneath our sanitised sheen the world is disintegrating into a fractionalised state. The Utopian ideal where we celebrated diversity and attempted to understand our cultural differences seems a universe away. Or is it? Can science back engineer us out of this fix? Or can art take a fresh look and invent some kind of radical new medium that is about us, the people? What if there was a system that could act as a universal interpreter between cultures - some kind of interface that would not just simply translate the language of one culture into another but transform the entire culture? Although we may never fully unravel the deep-seated mysteries of other peoples, there may be a third way whereby we can at least enter that world and engage in positive discourse. The Cultural Transformer aims to create through the ‘opera’ model a new kind of intelligent and sensitive interface that can, through a process of listening and interpreting, transform the cultural traits and behavioural patterns of one culture into another.

The first stage of this research is to develop a new artificial culture of which part one will be the creation of a synthetic musical language. This language will not be based on any preconceived notion of music but will be designed to act both as a new medium of communication and as a universal translator. The Cultural Transformer will ultimately represent the conduit through which diverse sets of complex data can be transmuted. The ultimate aim is to create a cultural transformation in real time that represents a visual and aural metamorphosis. This will initially be in the form of a live opera performance with the ‘host’ culture simultaneously translated into its virtual equivalent.

**Figure 6 Pauleto and Greasley working with Audiosculpt**

So why opera as model?

One of the advantages of utilising a musical format is that it will enable us to explore notions of translation in a more abstracted way; the analysis and translation of moods and emotions providing a more meaningful interpretation of information than current methodologies allow. The first stage will be to find the

tonal centre for each culture then to slowly build up a kind of communal harmonic. The musical language of a culture as tribe is often a representational manifestation of that culture. The patterns, inflections, intonations, rhythms and syntax of sound often exist in both the spoken and musical form. Just as Verdi notated passages of recitative with an ear for spoken Italian so exists a multitude of language forms where the inherent complexities of rhythm, exotic scales and vocal contours sculpt the music. This correlation between music and spoken language may help us in our reinvention of the way we perceive information particularly in our understanding of time, space, content and mood. The ‘opera’ model pushes music beyond the auditory sensation and allows us to explore an alternative medium for mood and information.

**Viewpoint: Sandra Pauleto**

Pip’s project is a fascinating one. Imagine capturing what is in the sound of the word “love” that carries the sentiment, the emotion. Imagine a person who does not speak English hearing and watching that “sentiment” expressed in some sort of pure, abstract language. And finally imagine this person understanding this sentiment. Is there such a thing, a parameter that we can extract from a word, a piece of music, or an image and that we can use to create this abstract, intermediate language? These have been the problems and the fascinations encountered working on this project. Many questions were raised: philosophical and linguistic questions. Are cultures commensurable? In other words is it possible to translate from one culture to another? Dr. Connolly of the Computer Science department, whose research focuses on linguistics and language processing, helped us to pin down the doubts and problems with this project. Something in particular, did bother me.

When Pip described his idea of an abstract language as the “next door neighbour syndrome”, I knew that the idea in itself is not impossible but is based on something we experience often, the problem is its complexity. The “next door neighbour syndrome” could be described as follows: sometimes you can hear your neighbours talk, or sing, or shout, etc. You don’t understand what they say, because the walls don’t allow you to. Still, you often know, with some certainty, if they are discussing, arguing or talking about love. What is it in the tone, rhythm, and pitch of their voice that makes you understand what they mean? We could therefore say that there must be something in the sound of a language that carries some meaning in itself, but this something is very hard to pin down, or maybe only intuition can grasp it. Pip and I explored the idea of creating an "abstract language" that, without carrying all the meaning of a sung text from one culture to another, could carry its atmosphere, its emotions. I showed Pip the sound analysis and synthesis software that we have. I demonstrated to him what musical parameters could be extracted from a recorded sung text and how these parameters could be modified and used to synthesise a new sound sequence which maintains a relationship with the initial sequence. While Pip was exploring the nature of vocal sounds, in terms of rhythm, expression, sound purity and noisy characteristics, I was experimenting with the Diphone and Audiosculpt software trying to realise in practice Pip’s ideas. Together, in this residency, we went a step further towards the realisation of an abstract language that carries emotional and intuitive content from a language to another.
When I first learnt of the possibility of doing a residency in the C&CRS studios, I was most interested in devising something that challenged the way in which people commonly responded to computers. This stemmed from my fascination with the way artificial intelligence research attempts to copy real life by studying physiological aspects of humans and the material world. With neural networks for example, there is an attempt to create a program that is as close to real life as is possible. I hope to offer an alternative to this approach. I began from the premise that most computer user frustration stems from a high expectation of the application being used. The faster and the more utilitarian computers become, the more our expectations of their speed and ability increase. Making computers more intuitive and consistent, whilst increasing usability, helps to feed this high expectation of computer usefulness and the ensuing frustration as the computer inevitably disappoints the user. Rather than basing my project on the material world, I turned instead to human relationships. I believe that the essence of friendship is a sense of kinship, love and compassion. In defining a personal relationship, compassion is the key, as without it we would be unable to forgive our friends their faults and therefore the friendship would no longer exist. From this, I set about devising a way in which a computer program could be written that instilled a sense of compassion in the user and therefore allowed forgiveness and a lowering of expectations. Enter Unity: the Hand Held Best Friend.

In order for the Hand Held Best Friend to be successful it had to have a defined, friendly and helpful personality. But in order to lower expectations it also had to be unpredictable, slightly petulant, and a little demanding. These were aspects I was quite clear on when I first arrived at Loughborough. I did not want it to be confused with the utilitarian applications normal Personal Digital Assistants (PDAs) had, so it was important to me that it was a separate entity from a PDA. I liked the idea of it being mobile so that it would be on hand for that unpredictable crisis. I was also sure that it had to have some telecommunication capability as it is quite important that the Hand Held Best Friend would be able to contact the user of its own accord. Having no computer programming experience I was not sure of the form of programming this project would take. After intense discussions with Mike Quantrill about the software and Colin Machin about the hardware, I wrote the specification for a program to be developed for a PDA. After more decision making with Sandra Pauletto, the initial program was written by her and then extended by Ray Fong. My original concept has not changed, although details of it have, such as limiting conversation and not using voice synthesis. I have also been made aware of some useful technology, such as making the program available on the web, so as to allow for further development of the characters. I have been surprised at how long the whole process has taken so far and I have had to become realistic about the current level of success. There is a long way to go. I still can’t wait for it to vibrate when it laughs!

Viewpoint: Sandra Pauletto
I worked with Sarah right at the beginning of the actual programming part of her project. Her project involves programming an application for a Pocket PC which allows it to become your Best Friend: he will talk to you, learn who you are and what you like, and it will entertain you by telling you many stories. Sarah had a quite precise idea of how the interaction between this technological friend and its human interlocutor should be, but she didn't know how to program an application. So this is where I started. I had a look at the possible programming language to use and realized that Visual Basic was probably the best for creating an interface quite quickly. Then, because time was quite limited, I asked her to try to define the most basic sequence of dialogues she wanted the two friends to have. I concentrated on programming that sequence has a first building block from which someone else could afterwards extend. Fortunately, a Masters student, Ray Fong, found this project very interesting and he decided to work on it. I explained to him the work I had done and eventually he was able to produce what we can see in this exhibition.

Viewpoint: Raymond Fong
My involvement with the Hand-Held Best Friend (also known as Unity) came about around the middle of June: As part of a master’s degree in Information Technology, I was to undertake a project to demonstrate an ability to put theory into practise. This choice of project presented me with two opportunities: To learn a new programming language and to work on a platform other than a PC. I had attended an art/technology seminar presented by Sarah earlier in the year, so I had a brief glimpse into the sort of styles Sarah worked in.

I was introduced to Sandra Pauletto, who had previously worked on the project. She had produced a working shell emulator program from which I could develop a future version. My primary objective was to combine the two using Embedded Visual Basic. Although this meant that I did not contribute to the original design of Unity, I had been given enough information and assistance to successfully implement the tasks needed to create a fully working emulator version. From a personal point of view, this was a role which I was happy to adapt to. My expectations about this project have already been surpassed. To get a satisfactory working version is one thing. To have it on demonstration at an exhibition is another entirely. The simplicity of the program in terms of both design and coding hides the fact that Unity can potentially become something fashionable. When the device finally becomes a product, I can proudly look back and remind myself that I assisted in producing the core program.
The 21st Color Organ: Jack Ox

Jack Ox, an artist who is based in the USA and also works often in Europe, makes works in which music and images are closely related. Her primary goal is to create an intimate correspondence between visual and musical languages. To achieve this, she has to determine structural parameters of the piece of music to be visualized, which take the form of operating principles and data sets that are encoded in MIDI files in 'The 21st Century Color Organ'. When a work that represents a transformation from music to a virtual world has been constructed, the viewer can move at will through the space and touch elements of the sculpture and hear the sound which originally produced it. In this art experience, the participant can move around in a three-dimensional visual space that is also a representation of a musical space. Although the viewer does not influence the state of the work, he or she chooses a viewpoint and moves around in a very real and dynamic way. A critical part of the creative process over many years for Jack Ox has been her collaboration with composers and experts in digital technology. She has moved on from having a technological assistant to one of having a technological equal partner and co-author of her art. She also finds that such collaborations provide the triggers for significant creative advance. Jack took part in a COSTART residency in June 2002 when she worked with Mark Fell and Manu Uniyal to develop three-dimensional representations of a musical score.

Figure 8 Sound Visualization: Curran and Ox, 2002

The prints shown in the exhibition are models of sound files given to me by Alvin Curran, the composer who is organizing our "Gridjam" on the AccessGrid (SuperJanet4 in England). There are 180 sound files which are being modeled to reflect pitch from the front of the object and dynamics from the top. This is one of the models produced at COSTART. We used 3D Studio Max to create these models. The top is scaled in and out, thick and thin, in order to represent soft and loud, while the model is shifted up and down to the changing melody of each file. The Gridjam is the third piece of music to be realized in the ongoing project, The 21st C. Virtual Color Organ, which will continue to be developed as long as David Britton and I are working together. Further work will be done at Cal IT(2) at the University of California in the Spring of 2003.

ViewPoint: Mark Fell

When I first met Jack I knew very little about her work, background and didn’t know what she would be like to work with. I was really happy to discover that we seemed to get on well and that she enjoyed the process of making work. To her this was a lively activity. Jack had already made a start on making this work that involved a great deal of technical resources. Our aim for the week of the residencies was to take a series of sound files and to map the pitch and volume onto three-dimensional objects. These would be loaded into a system that enables people to remotely interact through the playback or sound files and corresponding images in a three-dimensional space. For most of the week each of us sat in front of a computer and repetitively entered and drew points and co-ordinates. At one point I asked if it might be a good idea to automate this process, but Jack replied that she liked the idea of the data going through the body or human process. There were no major technical issues encountered at this stage in the making of the work, although which platform we used became something of an issue.

ViewPoint: Manu Uniyal

Jack Ox’s main idea for the residency was to create a set of three-dimensional objects that she could then place in her virtual environment. Two sets of linear waves, one showing pitch and the other volume/melody information derived from sound files by composer Alvin Curran, were used to generate the objects. I was asked to develop a means of translating the information into 3 dimensional models. One set of waves provided the ‘Z’ axis information allowing us to develop the shape profile. The shape was then extruded and the other set of wave information was used to modulate/change the ‘XY’ axis of the object. The idea was that these models would be placed in the virtual environment. They would then change shape/develop/interact as the viewer navigated around the world. Jack’s clarity helped us go forward in the project with much ease. She knew what she wanted. She did not know how to do it, even though she had done something like this with Dave Britton. Our methodology to tackle the issue was a different approach compared to what she had seen in the past. She also had all the information that was required to achieve the task. Jack was an interesting person to work with. I found her ideas refreshingly different. She had put in a lot of effort in generating usable datasets from the basic sound files that made it easy to develop the three-dimensional models once a methodology had been designed and agreed upon. Since the process of developing the models, once understood was a just matter of repetition, it was suggested to her that perhaps automating the whole process would make things go faster. Jack disagreed with the idea. She felt that total computation/automation would somehow corrupt the process of her work/end goal. There was no addition from a human/creative point of view, once the basic concept was developed. At the end of her residency she said she felt that she was taking some positive experience and ideas back with her that would help further her this work.
work was very much a response to spaces, in a similar way to how locate a site to work within. It was interesting to see how George's

On the first day we decided to walk around the town, perhaps to explore the different ways we would like to explore. These were shared many ideas about art and we were both very eager to work together. At the start of the week we had some very rough ideas which might explore some of my previous concerns such as the body, site and scale. My work evolves from responses to a given site or place whether architectural, contextual or situational. It evolves through the process of investigation and research. It may be a theme or the body in relation to the environment at a given moment in time. The choice of subject matter is dependent on my responses to a given situation at the time. In this sense the work is speculative and playful as I consider/reconsider the flow of experiences and encounters with places, situations and people. Generally the media and material used are digital video/audio which is usually video projected or fed to monitors. The aim is to “intervene” and re-present the familiar and, hopefully to provoke and/or surprise as well as challenge expectations. My background as an experimental film/video artist who has worked broadly with “expanded” notions of cinema has always been to exceed and challenge the conventional boundaries of the “classical film” system. The challenge arises when I look around for inspiration - for a clue into what it is I am searching for. This is unknown, sometimes grasping and difficult, often fraught with uncertainties. But I can only at the time materialize my vision through means which are available to me. Previous work with expanded video projections operated on spectator/spectacle relationships, together with the production conventions and display known at the time. This led me to re-thinking some of my work especially for COSTART residency and the collaboration involved.

My work is firmly rooted in the expanded cinema works by Film Artists working in the 1960s and 1970s – where the viewing environment, possibilities of multi-screen projection and the works I produced anticipated developments in digital interactivities that explore audience participation. My installation work explores multiple facets of site-specificity and I am aware of the limitations this poses. Within the context of the residency it was interesting to first pursue and investigate the potential of the digital technology on offer and then explore and research a site where such an application might be used rather than the other way round. The COSTART Environment although not entirely unfamiliar, presented me with both the unknown and the possible. I work within the parameters and constraints of known or existing technology but suddenly I became aware of my own limited knowledge in the area and its potential as well as realising the limitations and, at times, frustrations which I encounter with applications I regularly use. In collaboration with Mark Fell I wanted to explore the potential of what Max software may provide in relation to live and recorded video/audio input, thereby exploring both real time computer control over audio/visual information and that of pre-recorded information.

Mark: I had worked with George for several years in an art school, but we had never actually collaborated on a project. We shared many ideas about art and we were both very eager to work together. At the start of the week we had some very rough ideas about the kinds of things we would like to explore. These were mainly themes that were common to both our previous works and also to attempt to combine our approaches to developing works. On the first day we decided to walk around the town, perhaps to locate a site to work within. It was interesting to see how George’s work was very much a response to spaces, in a similar way to how I respond to technologies. Although there was a division in our roles, this was not a clear-cut division. For example there was no real sense of one being a technologist, as we both had complementary technical skills, and the other being an artist as we seemed to have complementary artistic ideas. But there were definite differences in what we did. I tended to work with software technologies whilst George had a wealth of knowledge and experience in projection, digital video and the use of space.

From the very start of working on the project and developing the ideas we were together. We decided to explore the idea of recording the activity within a space and then playing this back in distorted ways. At first we attempted basic image manipulations, but then it was agreed that we should manipulate the timing of playback so that things became disjointed and fragmented. This approach worked well and we tried a series of variations. A major breakthrough came when George suggested that we set the system up in the gallery space and start to explore the space. Immediately things seemed to fall into place. We soon became aware that we had stumbled upon a rich vein of material and that there was a series of different combinations and variations that could be explored. We agreed that it was better to make several simple works rather than one cumbersome and complex system that attempted to accommodate different variations. As the work was developed within a technological framework, there were few technical issues. The work was grown in the technology as much as the space. Within the five days allocated we created a display of live camera input combined with recordings of earlier input. The system takes a live video input from a camera that is fed into software which then cross fades at varying speeds between the recorded and live input.

Figure 9 Water Feature Projections Saxon and Fell, 2002

What is important about the work is how the idea for the work came about. We did not start with a predefined idea, but, instead, used the computer to develop an idea and deal with the concepts we were interested in exploring. This approach is an important part of how the work was designed and constructed. Tests were performed in the space to see which kinds of combinations gave the most interesting results. Initially we placed recorded imagery at either side, and live imagery in the centre. This was discarded but the split screen stayed because we liked it so much!
Calligraphic Soft Board Performance: Yasunao Tone

I have pursued a totally new relationship between text and sound aside from traditional lyric-melody and more trendy textual music as well. Molecular Music (1982-5) is an earliest experiment as such. The piece is based on poems written in Chinese characters including three from the Tong Dynasty as well as an 8th Century Japanese poem. The Chinese characters of the poetic text are grammatically studied first and then, appropriate images are chosen from found photos. They are then filmed and the rhythmic structure of the spoken text is transferred to the structure of the film. The piece employs the sound-generating system including light sensors and oscillators connected to light sensors, so that the projected film creates sounds in accordance with the specific arrangement of the sensors and changing image brightness.

In 1992, I was commissioned to compose a piece for CD as recording medium, and again, I used images transformed from the Chinese characters of poems with the same manner; two ancient Chinese poems from Book of Songs, Shi-ching. This time, I scanned the images on computer and digitized them. By using part of the optical character recognition program developed by McGill University computer department, which has a system that makes it possible to obtain many variants of histograms from the digitized images, I had a computer read it as sound waves. The resulting sound waves were made according to the order in which their corresponding characters appear in the poems. Thus appeared my first album, Musica Iconologos. I took this idea further in a CD-ROM project, -work in progress since 1996 - another sonic translation of ancient poetic text, this time the mammoth Man'yoshu; 4,516 poems dating from 8th century Japan. Again the characters are transformed into pictures and then sound waves, but here the poems (which were still primarily transmitted orally) were transcribed in a system that combines 2400 Chinese characters with only 89 Japanese syllables, with some characters chosen based on Japanese phonetic and semantic value, others based on puns or wordplay, which I converted to 2,400 entry sound dictionary. I have a program that converts 4,516 poems to sound with combinations and permutations. The poems are not interpreted but transformed into sound so the pieces are not multimedia but conversions of media. This is crucial to use digital reproductive means, because digital reproductive means don't remain in the limit of reproduction, which simply record and playback. The digitizing process equates all the differences from the sources like visual, auditory and textual materials with the same binary codes. Therefore, conversion between text, sound and image has an inherent necessity for digital technology.

At Loughborough University, I was lucky enough to have been assisted by Mark Fell who had known my previous work and understood my ideas. He suggested using the Soft-Board for the visual to sound conversion. The Soft-Board system can detect hand drawing movements with the markers on the board with the accuracy of pixel by pixel, then the drawn lines are converted to binary data and stored in a computer for processing. The program Max/MSP makes parametric variants by scanning lines of video image from the harmonics we created beforehand. It also makes it possible to trace the positions of a moving hand with a marker to coincide with the sound distribution of pitches and timbres. So a stroke of calligraphy or tracing outline of an image invokes a great variety of sounds.

The Soft-Board has advantages over other devices I have used. First, it makes it possible to do a live performance situation by combining with Max/MSP. Second, with the earlier works mentioned, I had to transform the text into images, which is only possible with pictogram-like Chinese characters. With the Soft Board I don't need to transform Chinese characters into images but simply draw calligraphy on the board. Also, it enables any text to be transformed into sound. In only five days it was quite an achievement!

Figure 10 Tone performance using Soft-Board, July 2002

Viewpoint: Mark Fell

Yasuano came at the end of the residency period and was the last artist I would work with. I had met Yasuano in Sheffield and spent some time discussing both my work and his. It seemed as if we were from very different backgrounds, traditions, cultures and generations but later I came to the conclusion that even if we had few traditions in common, we both placed ourselves firmly on the outside of others: For example, we both disliked traditional forms of computer music. As I learned about Yasuano’s work, I realised how many of his experiments and ideas had made possible much of the work I was associated with. Working with Yasuano was not what I expected. I had thought that the work would be easy to make and that he would be satisfied with most of my initial experiments, leaving time for us to discuss other things. But this was not the case, and Yasuano was quite specific about what he wanted. I found the process of developing the work very difficult. This difficulty was not due to any technical limitation or problem that we could not overcome. Instead the difficulty (for me) was in making a system that fitted conceptually with Yasuano’s approach to making his work. The problem was that I had to get away from a way of thinking about the problem of image-sound correspondence and interaction and to approach the problem from a new angle. Yasuano says that he is not from the western musical tradition, and my work contradicts the academic/electro acoustic tradition. Hence it became obvious that the methods, practices and procedures of these traditions should be rejected. The implication of this stance changed the way we made the work. We could say that on a very basic level there was a changed relationship between the technology and the ideas that it enabled. A simplistic appraisal of this difference might suggest that the technology was used to generate ideas, not simply to communicate them. However, it is more accurate to say that the conditions that one might apply to the work were also applied to the making of the work. This creates a problem as art of this nature perpetually rejects, questions and undermines everything that it is forced to accept, and in doing so perpetually destroys itself.
An increasing interest in drawing and performance led me to the idea of a drawing machine. There seem to be a lot of things of that name around most of which make drawings often where a computer or mechanical device creates the drawing with little input from the user. If the user has any interaction it is very dependent on the device what results occur. Watching sparklers being used on Bonfire Night like pencils which created momentary drawings where the performance and movement of the user was integral to the overall effect, I wondered if it would be possible to capture the drawing for an audience as it was made by the performer. Rather than a device that created drawings, I was thinking more of an instrument that allowed creativity and skill allowing for scripted and improvised work. The firework sparkler proved to be a good model for what I wanted to do in that it is portable and simple to use allowing the user to concentrate on the making of an artwork. Trying to imagine what could be achieved I started working on simple animations which used a variety of drawing methods.

Width and pressure of line needed to be considered as well as the possibility of using colour and a variety of fills. The similarities with a musical instrument led me to think of adding sound and an ensemble of players. Working with computer scientist, Alastair Weakley, a number of different options have been tried and considered. One of the most exciting things we saw was CODA made by Charnwood Dynamics, a system for recording human movement used for analysis of body movements in physiotherapy. The machine was excellent and seemed a good answer, however it was very expensive therefore impractical for my use and not as portable as I had wanted. Initially, a trial was made using small sized sensors for recording motion and impact on vehicle air bag systems, these were connected via a circuit board to the program Max where the movement was analyzed and adjusted within the program to record the movement more predictably. This proved to be near to impossible, despite some interesting results, it would have been over positive to even suggest the user had any control over the movement of lines on the page.

Currentlty we are looking at the possibility of using sensors positioned around a room to record the movement of a wand played back through a computer which presents the results through a projection along with sound made which corresponds to the movement of the lines as they move across the screen.

**View Point: Alastair Weakley**

During our initial discussion at the COSTART workshop in February Ray and I spoke about his interest in a system that, rather like writing one’s name in the air with a sparkler, would allow the user to make three dimensional drawings in space. It was in a message to Ray some time afterwards that I suggested he might like to experiment with an acceleration sensor during his stay with us. The suggestion was that the user might hold such a sensor and by monitoring the acceleration readings that it produced, it would be possible to track their movements. Ray was interested and we agreed to pursue this. With hindsight, I realized that this was always going to be an imprecise way of measuring position and our experience during the residency bore this out.

For three days of Ray’s five-day stay at Creativity & Cognition Research Studios we struggled together to make sense of a seemingly unending stream of numbers coming from the sensor. We produced drawings, but what were they supposed to be? Certainly, there were moments when the line scooting about the screen seemed almost under control but these were, sadly, fleeting. At the end of the fourth day, I had a brainstorm. Realising that I would never be able to produce a line that was an accurate representation of the user’s hand positions over time I suggested that we might make a drawing that was a record of the user’s motions over time. An aggressive or flamboyant gesture would produce a different sort of line to a hesitant or gentle movement. Ray was not to be swayed, however, and so the search for a solution continued. On the morning of the last day we discussed the problem with Colin Machin. The new proposal is that the user might hold a device that makes ultrasonic “ticks” at regular intervals. By measuring the time differences between the detection of these sounds at different points in the room, it should be possible to calculate the position of the device. We are now investigating the feasibility of this system and are fairly optimistic that we may eventually be able to produce a working product.

During my time working with Ray I learned a considerable amount about this sort of collaboration. Coming fresh to the idea of an artistic collaboration I was slightly unsure of my role. I was nervous about making suggestions to Ray which might influence his ideas; I think I viewed myself as a tool in the process rather than a partner in a joint project. It was only when words like ‘we’ and ‘our’ started to appear in his emails that I realised I was to be more than just a facilitator. Nevertheless, I was still uncomfortable when I felt that my technical suggestions were spilling over into the conceptual arena. On the one hand, I felt, it would be wrong for me to try to steer the project into an area with which I was familiar. On the other hand, it seemed important that we should make some concrete progress with the project during the residency.

My plan had been to spend a day or two using Max to learn to interpret the data from the accelerometer and then to transfer our work to Director, a program with which Ray was already familiar. Once we had an algorithm that worked, I thought, we could discuss what to do next. It is unfortunate that we were never able to progress beyond the first stage during the residency. However, the time, I think, was not wasted. Although the drawings that we produced were not an accurate representation of Ray’s hand movements, they did allow him to see more clearly what the system might be like to work with in real life and some of the issues that might crop up. This, together with our investigations of alternative technologies, has, I believe, reinforced our commitment to producing a finished work. Moreover, we both agree that we were right to press on with the original concept rather than taking an easier path in order to finish something by the end of the week.