New Forms of Narrative and Audio/Video Practice

AUDIO VIDEO APPARATUS/ NARRATIVE STAKES

Notebook 6

Tulip Theory

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Éditions de l'École des arts visuels et médiatiques de l'UQÀM

This publication is the result of the work of a group of researchers and artists from the Université du Québec à Montréal and Concordia University who study and implement new narrative forms related to digital audiovisual technologies and develop new media languages.

This research took place over a period of four years (2003-2007) as part of the group's program of activities, which was supported by the Fonds québécois de la recherche sur la société et la culture (FQRSC).

The work investigates, from a variety of perspectives, the impact of digital technology on the concepts of time and space in the creation of new digital audiovisual narrative forms. The group members' approaches and working methods are diverse in terms of the manner of writing, representing, producing and displaying the work. At the same time, each member's practice points to issues regarding the new roles of the creative artist and the spectator – or reader – in the conception and reception of a work of art. The approach centres on the development of new research tools designed by and for artists.

The archiving and analysis of key works allowed us to survey artistic and technological methods used by artists engaged in new-media practices, while isolating the logic and structure inherent in the work itself. This exploration raises questions concerning the audiovisual mechanisms and methods of sequencing images and sounds that are involved in creating new narrative forms.

The creative component of this research also gave rise to the creation of artworks by members of the group, some of which have been brought together on the DVD included with the publication.

Chantal duPont
Principal Researcher
New Forms of Narrative and Audio/Video Practice

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TECHNO WHISPERS[1]

by Leila Sujir
with Research Contributions by Joseph Cherlin & Mike Nunes

The whispers of narrative within the software itself.
The intersection of the poetics of the decorative with the poetics of the document:

altercation/alteration
abstraction of actualities
awkwardness of the placement of the objects and the way objects bump up against each other
a kind of messiness, a clutter, in ephemeral media space

The electronic materials made tangible through their placement onto poetic structures – time and data-based media allowing this recollecting and re-imagining process. Technology as an archiving medium.

Considerations: now that video art as a practice is no longer 'new'

Video art practices within contemporary art-making emerged from art and social change movements in the late sixties and early seventies, with the works developing a range: from explorations consciously referencing television and popular culture to explorations around the spatialization of narrative within installation and sculpture practices; to explorations of documentary practices outside of, or beside that of film or cinema, including event-based works, documenting performances or actions; to explorations of identity and culture, gender and sexuality, race, history and memory, to name only a few of the concerns.[2] The question, "how does the 'new' arise?" continues to be provocative at the conclusion of this four year research group process of New Forms of Narrative and Audio Video Practices.[3] In print and in conversation, there are signs that practicing video artists in North America are noticing the disappearance of single channel video art from the 'scene of reception' from what once were extensive screening venues at festivals, artist run centers, and museums and galleries. Several artists/theorists are contemplating what this 'new' landscape of art-making proposes, from Anne Golden and Laura Jeanne Lefave's new study interviewing video artists across Canada on the status of video and production,[4] to Tom Sherman's recent writing differentiating cinematic work from video art works.[5] The relationship of art practices to institutional processes has been one video art practitioners have observed first hand--in particular, how the institutions integrate a 'new' art practice into a field, how the 'new' field comes to contribute knowledge and create a history. I'm thinking here of what forums are considered legitimating ones for 'new' fields, especially when there is a relatively brief (almost forty year) history for video art.[6] Interestingly, this slippage of video out of the field of the 'new' within the reception and distribution processes has been accompanied by the situating of video art within and across various categories: media arts, new technologies, interactivity, and 'new' media although many writers and exhibitions are making the point that 'new media' is no longer 'new'.[7]

Medium specific fields rather than conceptually specific fields

Working within the same sets of software and sets of technologies, are we bumping up against the apparatus itself? I am thinking now of the attention that structural filmmakers put onto the language of cinema and the cinematic apparatus, whether that was by constructing an apparatus to allow the camera to move without a human operator in *La Région Centrale* (1971) by Michael Snow,[8] or whether that was Joyce Wieland working with fellow artist Hollis Frampton and people from Bell Labs for the text permutations in her film,[9] *Reason Over Passion* (1969), or Steina Vasulka with her circular vision project, *Machine Vision* (1978), accomplished through a collaboration with an engineer,[10] or Nam June Paik's synthesizer (1969) which he created with engineer Shuya Abe.[11] I think too of Lev Manovich's current theoretical explorations on the software itself, in particular, his essay on After Effects.[12] In Wieland's film exploration outside of what she was strictly a structural film problematic – her introduction of politics and humour – challenged what had been primarily an examination of the material and structural processes of film.[13] I also think of the questions artist John Oswald raises about a recent work he considers a 'film' made without the use of a moving images camera.[14]

What is old is new again, or a play of time travel for the viewer: across decades, across centuries

Interactive artist, David Rokeby notes about his project, *Seen* installed in Venice in 2002, an artwork database archive of moving images, a kind of surveillance of the city which constructs the work: "This [sequence of images] turns each individual person into a Muybridge motion study, or a procession of themselves. Areas which experienced the greatest density of traffic in the recent past would be quite densely packed and less travelled areas would be sparser, providing a kind of probability plot of activities in the space. This video stream has a strangely archaic appearance, looking very 17th century for some reason."[15] This work of Rokeby's points to the 'information' which the project conveys about the city, the movement through the city spaces creating drawings which can be seen as data. These questions around the city and observations of the city have been arising in numerous and notable ways.[16] Fellow researcher within this New Forms of Narrative (NFN) research group, artist Paul Landon's video and photo work, *Intérieurs: Walter Benjamin and the Paris Arcades [Photo book project], Extérieurs: Paris 2001 [DVD]* plays across time, with the Paris Arcades of the present 21st Century referencing Walter Benjamin's massive research project, *Arcades*, on Paris of the 19th Century.[17] This process of retrieval of archival artworks sets up reverberations, plays of the present within historical re-considerations.[18]

Re-purposing the science paradigm: old technologies, 'new' possibilities for "innovation"?

Notes towards Tulip Theory

This art project, *Tulipomania*, is shaped by my participation in the NFN research project, around the question of how the 'new' emerges within audio and video practices, with questions around the archive and the database as a form of pro-

duction. Within the presentation of a colloque by the same name, NFN, in October 2005, presented at the Goethe Institute in Montreal where there was a lively discussion of media arts, Paul Landon's presentation on Canadian artist Gordon Matta-Clark's experimental film, *City Slivers,* stayed with me as I worked over the year, leading to this current exploration of video and audio slivering + compositing of a data-based video audio archive composed of cycling scenes through two cities and a video textile: one, from a bicycle in the tulip gardens outside of Leiden in the Netherlands, and the second, from a vaporetto as it moves through the canals of Venice, and the third, from a 'video textile' composed of video of Scotland and India for my two grandmothers.[19] Matta-Clark was 'slivering' actual houses for his sculptural works and within the film, *City Slivers (1976),*[20] matted off part of the frame, so the viewer can only see a thin slice of the film picture frame of the streets of New York.

Within the Interactions Lab at the University of Calgary, one of the technologies being developed by Mike Nunes takes a vertical slice of each frame and composites it on a timeline, what I saw as a kind of Gordon Matta-Clark algorithm.[21] Joseph Cherlin working throughout this research process, both as the programmer and as a researcher, describes the 'sliver + compositing' program with reference to archiving database retrieval:

> Our program creates a constantly changing 2D output from a given video. The output is remixed in a special way. Each row of pixels in the output image is taken from a row of pixels in the input video. But each row of the output is taken from a different time in the input video. *In this way, the output is a sort of remixed history of the input.* Using different styles of input, including some heavily pre-processed ones, we can achieve interesting visual effects.
>
> Another way to describe it is by thinking of putting each frame of the input video into a pile or stack. Eventually, this pile would resemble a cube or rectangular prism. Taking a 2D slice of this cube, we can produce our output.[22]

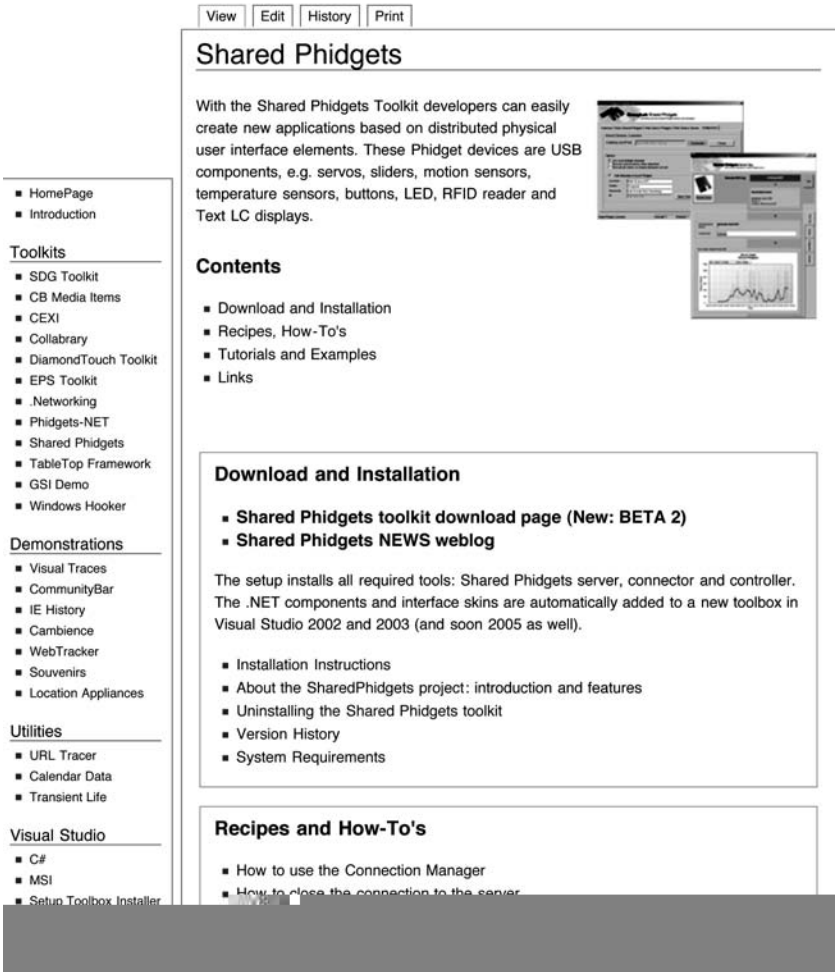
Cherlin continues the explanation of the 'sliver + composite' process below:

> More precisely,
> $o_x = i_{x,t}$
> where o_x is a row *x* in the output 2D image, and $i_{x,t}$ is the *x*th row in the input video at time *t*. We only show a portion of the output 2D image at a time, for instance, we just show the 512 most recent rows of the 2D image. As the parameter *t* changes, we can watch the 2D image change over time, as well as using *t* to play the input video.
>
> When we play the input video, we wrap it on a 3D object using a custom GPU shader. This shader, besides showing the movie, draws a translucent line above the xth row of pixels.[23]

The narrative of the development process at the University of Calgary Interactions Lab (i-lab) with Dr Sheelagh Carpendale and Dr Saul Greenberg and the Banff New Media Institute in the Advanced Research Technology (ART Lab) with Dr Maria Lantin

Phidgets

The 'sliver' or the 'cut' becomes the contact point in the software for the viewer with the audio video database, through a series of touch sensors embedded in a table, phidgets, embodied interaction, which have been designed in this instance, to provide a control panel, a kind of edit station or compositional instrument for the



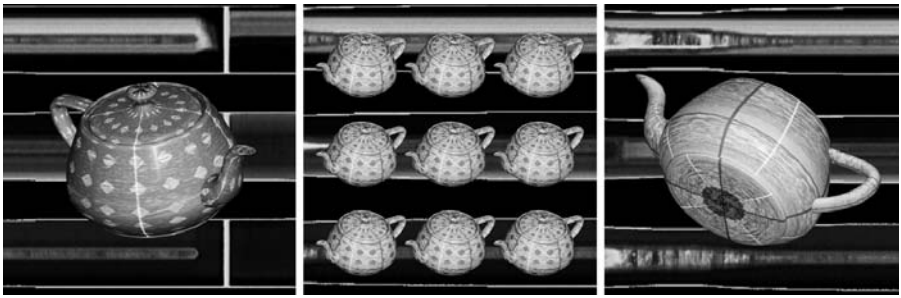
1. *i-lab cookbook*. Interactions Laboratory researchers maintain a 'cookbook' to collect software, toolkits and documentation.

view. With the maquette, we brought the two layers together to test how it would work with a single projector, with the organza scrim catching the layers of moving images in space. Later, the gallery where the work first appeared, the Art Gallery of Calgary, built a curved wall for the projection (12 feet wide, 8 feet high, five feet on the diameter of the curve); an organza scrim followed the curve of the wall, catching the layers of image projection. The gallery has a surround sound system of speakers within the ceiling, which allowed the distribution of sound into the space, again, spatializing the narrative.

The projection objects

With Joseph Cherlin working as a programmer and researcher at the University of Calgary, throughout the fall and winter of 2005 -2006, we wrapped various 3D objects with the video shot 'cycling' through the canals of Venice in a vaporetto and from the *My Two Grandmothers* (1991) installation. The objects are iconic, invoking a narrative of the 'everyday': the Utah tea-pot, used as a graphic standard within Advanced 3D graphics, a DC-10 plane, and the spoon which is part of the Utah teapot set. I was able to add an antique perfume bottle from Venice, a vaporetto, and a field of tulips, which Steve Nichols built in Maya at the Banff New Media Institute. These 3D objects texture mapped with video were ported into the CAVE at the Banff New Media Institute (BNMI) in March of 2006 for two weeks, along with the curved projection background of the sliver + composite, also a 3D object, but not recognizable as an object.

4. *Tulipomania* tests, March 2006, in the CAVE at the Banff New Media Institute for protyping (with Dr Maria Lantin).



5. 3D Video Projection & Wrap with real time 'sliver' sampling for an interactive project, *My Two Grandmothers RMX*; preliminary tests, prior to the completion of the exhibition at the Art Gallery of Calgary, June 2006.

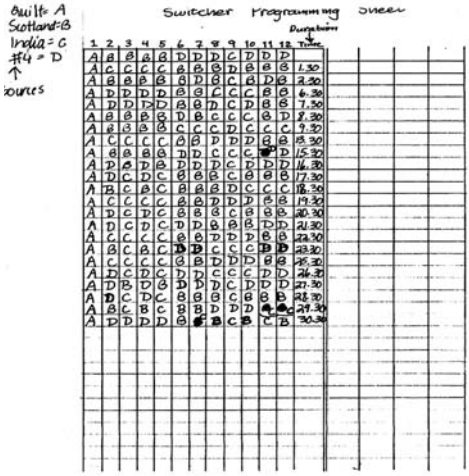
Techno Whispers, again & again & again

The CAVE is an old technology. Maria Lantin and I are now looking at how this project re-purposed an old technology, virtual reality (VR), by augmenting it, through a performance, and through the approach used to work within the CAVE as a sculptural installation space: putting a curved 3D projection with 3D objects (in front of the curve) into the 3 walled space resulted in the elimination of seams.

During the two week period in March 2006, approximately five days were taken just for the calibration of the screens. One of the problems Joseph Cherlin and I faced in the Interactions lab was 'display' – we couldn't 'see' what were were doing until we ported the project into the Banff New Media Institute CAVE. What is surprising then, is how this re-purposing of the old allowed the 'new' to emerge; a lot more work still needs to be done to work out these possibilities. This 'prototype' towards a new project is being called *Tulip Theory*.

High-end-Low-End Technologies, DIY inventiveness, & Video textiles

The project developed out of a previous multi-channel video installation I made in 1991, *My Two Grandmothers*, in which I experimented with a weaving structure to move four channels of video signals in a variable pattern throughout 25 video

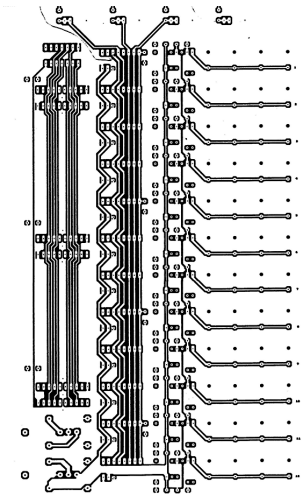


7. Programming for switcher for *My Two Grandmothers*, Leila Sujir, 1991

6. One of my grandmothers, Ratna Kalle.

sources (monitors and a 'video quilt') where the play of the video signal became texture and textile within an exhibition space,[27] working with do-it-yourself technology designed by Calgary-based inventor, Andy Jaremko. The switcher Andy Jaremko built for the project worked with low tech processes to achieve what ap-

peared to be high end results, primarily because they were invisible or not evident – the infra-red signal of the video playback (VHS) was activated by the switcher. The schematic shows the breakdown of the 25 monitors into a variety of patterns for the four channels of video to move through. Within the newly completed interactive video project, *My Two Grandmothers RMX* in 2006, the video installation becomes interactive, an archive data-base now of video and audio, which spatializes the projections of audio and video into 3D, wrapping 3D objects with video. The viewer is able to sliver + composite the four channels of video and audio of the three worlds, *My Two Grandmothers RMX*, *Day Old Venice*, and *Cycling Outside of Leiden* within 'real' time. The gallery viewers are invited to participate in a continuous performative role to 're-mix' the video for the audience of viewers within the gallery. When there are no viewers to mix the video, it still runs, but without the interactive component of the viewer involvement. To further this development of the narrative, the project installation had two performances choreographed by Nicole Mion, *Muscled Memories 1 & 2,*[28] which explored the spatialization of narrative by introducing performers and the audience into the space.



7. Switcher design for *My Two Grandmothers*, with Andy Jaremko, 1991.

The project explores what can be seen as surveillance technologies, ways of tracking the massive amounts of video data being collected; the project slivers of many moments constantly compositing becomes portraits of our city-spaces, out of the archive of the audio and video fragments. Technology, with its often invisible and non-intuitive apparatus, can be confounding and confusing. These "vision" technologies – the CAVE, like cinema and video – however, remain sites of discovery and invention, "lab spaces" for both art and commerce, pointing us towards intuitive dream spaces, which we can wander through, reflect on and interrogate.

Being located in the Interactions Lab at the University of Calgary for a year gave me access to new possibilities for developing video work, particularly in 3D, with interactive components, and with the use of embodied interaction (in particular, the 'phidgets' which are part of the development of the lab). This science lab is very much like an artist's studio, particularly with its emphasis on the physicality of material rather than just being located within the digital realm, and thus its connection with sculptural video installation possibilities, giving the momentum towards the development of new art work. With the i-lab cookbook tool-kits as inspiration, *Tulipomania,* as an art project and *Tulip Theory* is working towards the creation of 'video tool-boxes' towards further video art projects, with a mix of art, science, and popular DJ/VJ club culture. This gesture towards tool-kits in the i-lab as a way of archiving knowledge takes me back, in personal history to an encounter with a visiting artist to the Parachute Centre for Cultural Affairs in the mid 1970's, Robert Filliou. The neon-lit illuminated signage embedded in his took-kit and the tool-shed, with *imagination* and *innocence,* written in light, embody a practice of play and knowledge.[29] The old is new again.

Observations from the inside and the outside by the writer and artist k.g. Guttman, who is pursuing an MFA at Concordia University and enjoyed cycling through the Kuekenhoff tulip gardens for two consecutive summers (2005 and 2006) with a videocamera duct-taped to her handle bars.

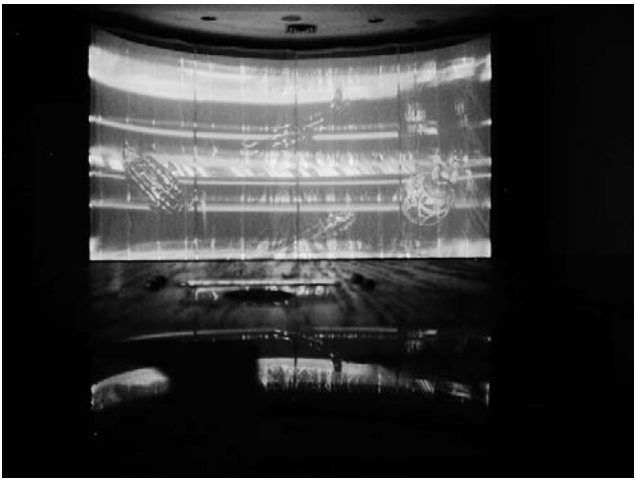
CONTEMPORARY COLLAGE IN THE WORKS OF LEILA SUJIR: "MY TWO GRANDMOTHERS RMX; TULIPOMANIA.1, DAY-OLD VENICE; TULIPOMANIA.2, CYCLING OUTSIDE LEIDEN"

by k.g. Guttman

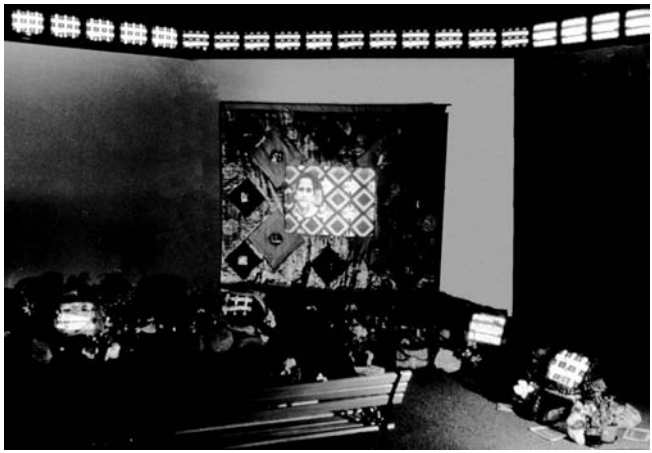
> As a system, collage inaugurates a plane of differences which is both about and sustained by an absent origin, the forced absence of the original plane by the superimposition of another plane, effacing the first in order to represent it. Collage's very fullness of form is grounded in this forced impoverishment of the ground – a ground both supplemented and supplanted.[30]

The multi-faceted interactive video installation project by the artist Leila Sujir features real-time video processing projected onto an elliptical screen, surround sound, and a table-top interface installed to be manipulated by viewers. The project assembles three separate investigations onto one surface. The overall arching themes that connect these investigations include issues of cultural identity and the histories of migration between the Occident and the East.

The first investigation *My Two Grandmothers RMX* (sourced from the artist's previous project *My Two Grandmothers*) touches on personal memory and family history. *Day-Old Venice* suggests a portrait in motion of the city, and signifies the historical importance of the port-city situated at the eastern cusp of Europe's frontier with the Near East. The third investigation, *Tulipomania*, continues the trajectory



9. *My Two Grandmothers RMX*, 2006, interactive video installation.



10. *My Two Grandmothers* , 1991, video installation.

of questions regarding cultural hybridity: "This work references the trade routes of various empires moving the *exotic east* into the *west* from the colonial time of the land route to and from the *Orient* to the contemporary time of transfer of capital through global electronic markets." [31]

The installation includes tabletop instruments that allows the viewer to compose an image from many possible sources of real time audio and video. Once selected, the video footage is projected or *wrapped* onto a graphically designed 3D object, including a teapot, a spoon, an airplane, a vaporetto, a perfume bottle and tulips.

Immediately the work recalls the radical destabilizing gesture of collage. Collage, the provocative act of fusing disjointed images, compiling disparate sources, destabilizing scale, dismantling a consistent plane that disrupts the authority of Renaissance perspective, functions as a critical strategy to arrest normative modes of perception. Collage evokes the dynamic tension between the signifier and the signified as identified in the structural linguistics of Ferdinand de Saussure, the relation between a material element such as a drawing, a trace, and the immaterial idea that lies behind this marking. The signifier is understood as an image or trace that replaces the original, a replacement that comprises the absence of the original within itself. This relation produces an awareness that meaning is to be sought in the difference from one image to another, and generates a kind of potential for new connections.

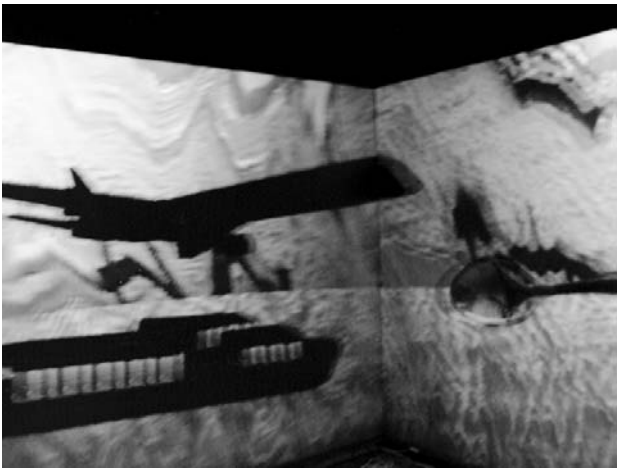
The form is exemplary to embody the hybrid identity of the artist herself, born into a context of mixed heritage, Indian and Canadian, and to address the principle that identity is formed in the movement between the two cultural points or a *plane of differences*.

Sujir's purposeful non-seamlessness in the compositing of her images works as a critical strategy to emphasize the polysemic nature of cultural and personal images and her project subverts a linear understanding of the term *origins*. A red tracking line, curved in the shape of a Sinewave, can be manipulated by the viewer. Wherever the line is positioned by the viewer, it samples the wrapped video footage on the objects and launches it, enlarged, onto the backdrop- creating a curtain of colour abstracted from the original image. This aspect of interactivity becomes a key metaphor in which to understand the intent of the work. Narratives are in essence mutable and subjective, and the process of memory and historical understanding undergoes the continuous movement of mixing and remixing.

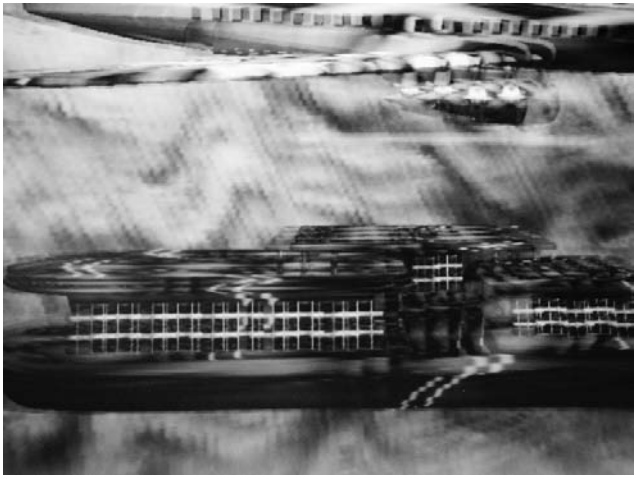
The Objects and their Movement: *Day-Old Venice*

> It is often said that the genius of collage, its modernist genius, is that it heightens – not diminishes- the viewer's experience of the ground , the picture surface, the material support of the image, as never before, the ground- we are told, forces itself on our perception. But in collage, in fact, the ground is literally masked and riven. It enters our experience not as an object of perception, but an object of discourse, of representation. Within the collage system all of the other perceptual données are transmuted into the absent objects of a group of signs.[32]

The collage-based tactic of destabilizing the firmness of ground is at work in *Day-Old Venice*. Four objects are presented in suspension, the "Utah-Teapot", a DC-10 passenger jet, a Vaporetto and a Venetian perfume bottle. The objects appear not to have the levity or buoyancy of a thing floating; they are simply occupying space in *mid-air*, unattached to the background. The background will be the rippled water of the canals of Venice or the greyed smoothness of its street, depending on what the viewer selects. The depth between the objects and the background is indiscernible. How far are they protruding into space? Combined with a manipulation



11. *Tulipomania* tests, March 2006, in the CAVE at the Banff New Media Institute for protyping (with Dr Maria Lantin).



12. *Tulipomania* tests, March 2006, in the CAVE at the Banff New Media Institute for protyping (with Dr Maria Lantin).

of scale, there is no reference point to understand their precise *location*. The sense of being unmoored represents the watery ground of Venice itself. A city-centre that attracts millions of visitors a year, a city that possesses a presence literally swelling and draining with the flow of people and goods.

13. 3D Video Projection & Wrap with real time 'sliver' sampling, an interactive project, *Tulipomania.1*, *Day-Old Venice*; preliminary tests, prior to completion for exhibition at the Art Gallery of Calgary, June - August 2006.

Cycling outside Leiden

A huddle of tulips appear hovering on the screen. The flower's curved and irregular surface is wrapped with images of the impressive Keukenhof tulip gardens in the Netherlands. This 3D envelopment of video footage rushes and pulses, leaving one with an impression of constant sweeping movement.

The viewer is able to move the images of the tulips around a fixed axis in short segments, suggesting a timid and uncertain presence on the part of the flower. They occupy space awkwardly, embodying an uprooted, dislocated reality in reference to their status as the transplanted symbol from East to West. Sujir presents tulip-as-fetish-object as the spectral presence of at once belonging and not belonging, referencing their far away aura as widely coveted currency in the first part of the 17th century. The tulip's hesitant movement suggests an anthropomorphization of its drastic shifting in cultural value.

The installation in its entirety makes fresh the form of collage in its incorporation of movement. The interactive aspect of movement suggests a playful component to the assembling of historical facts and personal memory to construct narrative. The restrictiveness of the component's movement becomes emblematic of their fixed circumstances in history, however allows for the flexibility of many interpretations.

My Two Grandmothers RMX; Tulipomania.1, Day-Old Venice; Tulipomania.2, Cycling outside Leiden further suggests an uneasy and compelling engagement with surface as the window to multiplicity and depth. The delicacy and finesse of the layers of images create a completely new terrain, an extended space of personal and historical contemplation.

TULIP THEORY: NOTES AND INTERESTS

by Dr Maria Lantin

14. Left and right: *My Two Grandmothers RMX*, 2006, interactive video installation. centre: "Muscled Memories" Performance with choreographer Nicole Mion, with dancer Kimberly Cooper, in "*My Two Grandmothers RMX; Tulipomania.1, Day-old Venice; Tulipomania.2, Cycling Outside Leiden,*" 2006.

By creating the 3 worlds, *My Two Grandmothers RMX*, *Day Old Venice*, and *Cycling outside Leiden*, we started an investigation into the creation of dynamic paintings using objects, video, images, and composites. The following are thoughts on the created worlds and interesting areas of further investigation:

The dynamic blend of foreground and background in stereo environments

The use of video time slices as source material for painting the background created an ambiguity, in colour, between one or more of the objects and the dynamically painted background. When the objects are displayed using stereographic techniques, the blend of the foreground video object and the background being drawn from its video is reminiscent of random dot stereograms where objects arise out of background through a contortion of the eyes.

The lack of contrast between object and background, and the playing of video on the object blurs the object boundaries and removes usual cues of spatial dimension and location, which in turn appears to force an emphasis on the 3D stereo cues (image disparity). Many remarked on how noticeable the 3D effect was – several saying they could see the effect despite having been unable to in the past because of vision problems[33]. An interesting question is how variation of contrast can be used to create objects from background – a kind of dynamic random dot stereogram without the pain or frustration. The effect could be compared to 3D shadow plays.

Video + Object: Solid + Fluid

The Tulip Theory worlds directed the interaction focus onto the objects and their videos. Choosing an object meant choosing the video and the sounds, and changing the painting. The interface was also structured by object. The video

was mapped simply onto the object using traditional texture mapping techniques. There are, however, numerous ways to merge a video (3D texture cube) with an object and these can be chosen dynamically. For example, in the *MTG:RMX* world, the teapot poured smaller teapots when tipped in the right direction. It could have instead affected the speed of the video. This is a simple example but taken further the interaction could have effected many perturbations in the video volume. This would be interesting to explore as a way to paint background and object and to change the geometry of the object. It would also be interesting to investigate opacity maps based on video gradients. This would have the effect of creating holes in the object based on the level of movement in the video.

Navigation and Virtual Worlds

In the 3 worlds, the painting reformed continuously by interaction and appeared 2D even with the use of 3D objects. The 2D appearance held true even in the stereographic projection. The objects were large and static, holding the frame of the environment while the videos play. Navigating between worlds can be thought of as changing frames in the environment. The interaction in the CAVE was mediated through a motion tracking system (Intersense IS-900) which tracks the absolute position and orientation of a wand. The wand also has 4 buttons and a joystick. The way that the wand is held is somewhat reminiscent of TV remote control and the switching between worlds and objects had the feel of switching channels but with a certain amount of 'content bleeding' between channels. It would be interesting to investigate how the change happens and to have worlds with more than 1 frame, similar to interactive photographs[34].

15. "Muscled Memories" Performance with choreographer Nicole Mion, dancer Kimberly Cooper and theatre artist Eric Rose in *My Two Grandmothers RMX; Tulipomania.1, Day-old Venice; Tulipomania.2, Cycling Outside Leiden*, 2006.

The blending of real with virtual

In the *Muscled Memories* performance, the virtual space was created first and the performance incorporated it to further its own aim of retelling Jeanette Winterson's stories of Venice and Leiden, and personal stories of grandmothers. Real objects like suitcases and teapots were used to highlight portions of the virtual world that portended to the story being told. The objects were props in and of themselves but they were also used to carry virtual props on their surfaces. In some sense *Muscled Memories* could be compared to a live performed *Machinima*, or as the orchestra for a silent film. It would be interesting to incorporate performance into the design of other worlds.

Another way to think about the environment is as an authoring tool for the creation of digital paintings and narrative props. It can be compared to hypertext in the sense that the elements of the story have been pre-chosen and the viewer can re-mix at will. The hypertext links are the objects and the world switching trigger. In the absence of performance, the hyperlinks become purely exploratory with the possibility of an internal narrative only. The real-time performance imbues structured meaning and narrative onto the hyperlinks. In that sense the environment + performance can abstractly be compared to a video game where the game is viewed as a constrained narrative creation engine – the story is created from the generated behaviour of the AI and the other players.

Research collaborations between Artists and Computer Scientists Notes from the trenches – authorship and innovation

Creating a new media work often will require the practice-based knowledge contribution of computer science and art. For the creative act to benefit all contributors, all must feel that new knowledge has been created in their field. This new knowledge should be well-defined and the discovery of interim results in both fields must equally be able to influence the creative direction. If this is achieved then the authorship of the work in is truly shared. If the authorship is not to be shared – if the piece is to result from a director-producer kind of model, then this must be stated at the outset. Tensions arise when the creative direction is somewhere between fully shared and singly authored, which is almost always the case. It is better to agree on authorship conventions early in the process, being mindful of the conventions of each field and where one might push some boundaries in allowing new forms of acknowledgements. Over time a multi-disciplinary team will cover the gamut of collaborative arrangements. It is not necessary that every project evenly contribute to each member's research agenda. To allow for this, systems of reward within our institutions and funding bodies must be changed to allow collaborative teams to thrive.

Research collaborations between artists and scientists in the field of new media are usually applied in nature. This type of research proceeds by creating something through the use of knowledge previously acquired. The hope is that the act of creating generates new information toward improvements on previous work, toward novel applied and theoretical directions. Some have dubbed applied research *craft-based* because it has an emphasis on learning by doing. The pres-

ence of the artifact sometimes eclipses the new that has been generated in the process of creation. In the sciences, the artifact is systematically studied with the assumption that it was created for that purpose. The results of the study are the outcome of the research. In the arts, this way of working is not only outside of habitual patterns but also discounts the importance of form and non-quantifiable attributes or effects of the artifact produced. Nonetheless a practice of studying the new media work produced with the aim of identifying points of discovery and directions for further study is desirable.

Innovation is usually defined as something not previously uttered or created. It is interesting to note that with the recent ease of self-publishing, the issue of what is new has become harder to pinpoint. Prior art is always lurking around the next web page. This points to the need of acknowledging the multiplicity and often synchronicity of voices involved in innovation. Eric McLuhan, in his book *Electric Language*[35], argues that innovation is necessarily composed of the old that is repurposed or re-invented. An example of this is the instant messaging techniques made popular by MSN and Yahoo were present in the 1980s as the Unix tools *talk* and *write*. Re-purposed as a social networking tool on the common platform, this instant messaging 'innovation' changed the way we keep in touch. This speaks to the need of constantly minding the past as a source of innovation, including looking at old technologies. McLuhan refers to this as looking into the rear-view mirror for the purpose of seeing what is about to overtake you.

Equally valuable to innovation, if not equally valued, is the creation of the seeds for innovation. These seeds can be as direct as creating a need for innovation through the impossibility of achieving something, or as indirect as changing someone's perspective in their field. Often we put so much value on measurable innovation that we forget the necessary mix of distinct inspirational events necessary for innovation to occur. The design of our research labs and funding sources must reflect the diversity of ways in which we create a culture of innovation and how those cultures manifest.

NOTES

1. The question of electricity powering these various 'new' technologies may be the 'whisper' referred to in this title. We are accustomed to power failures occasionally interrupting our city lives. I'm relating here – in a narrative tradition of 'telling' – two friends' stories of dreams: one a sleeping dream, from artist Lorraine Oades, who talked about a city with no water and no electricity, inspired possibly by the science fiction film narratives she had been watching as research for a new interactive project. The second one, a 'waking' dream, by Jean Bouffard, was related to me in a conversation and then, upon my request, in an email (February 2007):

> Over the last couple of days after a hard day of work when I was making my way home, I had a funny feeling come over me. It was a feeling of pending chaos that is about to hit on a global scale. Working in the brokerage industry and being under constant stress from dealing with either irate clients or individuals who lost loved ones, I was used to feeling particularly sensitive at times, but this was not the same sensation that I experienced when making my way home [through the downtown city streets]. As I walked home, I felt this odd sense of peace, but within those quiet moments, I had the eerie feeling that things are going to change in the near future and that this change was not going to be positive. This was to be a drastic change in the way we live and was going to impact life as we know it…All of this has left me feeling uncertain of the future. I have never felt this way before.

I think of the film, *My Twentieth Century*, directed by Ildiko Enyedi (Hungary 1989, with Aries Film Releasing 1990), which celebrates electricity, the lighting of the city, by placing the narrative's beginning in Budapest with the birth of twin girls the same night Thomas Edison exhibited his light-bulb in 1880. This presence of artificial light along with the slight hum produced by the light is one of the visual and audio whispers within this text. Within Walter Benjamin's work on *The Arcades Project* [a translation of *Das Passagen-Werk*, volume 5 of his *Gesammelte Schriften*, and other essays], is a provocative collection of his notes and quotations, "Modes of Lighting," in the city of Paris and Berlin in the 19th Century, on the illuminated city with gaslight and electricity; Walter Benjamin, *The Arcades Project*, trans. Howard Ieland and Kevin McLaughlin (Cambridge, Massachusetts: Belknap Press of Harvard University Press, 1999) 562-570.

2. Several Canadian books address the emergence of video art, its various histories, along with video as a site for explorations of sexuality, race and culture: Jeanine Marchessault, ed., *Mirror Machine: Video and Identity (Toronto: YYZ Books, 1995)*; Peggy Gale & Lisa Steele, eds.,*VIDEO re/VIEW: The (best) Source for Critical Writings on Canadian Artists' Video* (Toronto: Art Metropole & V tape, 1996); Monika Kin Gagnon, *Other Conundrums: Race, Culture and Canadian Art* (Vancouver/Kamloops: Artspeak Gallery, Arsenal Pulp Press, Kamloops Gallery, 2000). Catherine Elwes' essay, "Videoscan: video history – who needs it?" comments provocatively on the problematic around the construction of these video histories in the U.K., what's at stake, the divergent interests, the risk of the inherent narcissism of video, along with the position of an art-form within a technology that is a 'work-in-progress,' in *Video loupe: A collection of essays by and about the videomaker and critic, Catherine Elwes* (London: KT Press, 2000) 162-165.

3. The title of the research group process brings up our interest in questions both around how the 'new' emerges, as well as questions around 'narrative' in time-based art works. British artist Stuart Marshall commented on the "new narrative" in the early 1980's in "Institutions /Conjectures/ Practices" in *Recent British Video* (London: Onlywoman Press, 1993). Canadian critic Peggy Gale addresses narrative and anti-narrative tendencies in Canadian video art in her book, *Videotexts* (Toronto: Wilfred Laurier Press/Power Plant, 1995).

4. Conversations with Laura Jeanne Lefave, January-February 2007, Montreal.

5. Tom Sherman, "Video 2005: Three texts on video,"*Canadian Art* (Spring 2005).

6. Several Canadian book collections emerging from artist production centres include the following: in Vancouver, Keith Wallace, ed., *Twenty Years at the Western Front* (Vancouver: Arsenal Pulp Press, 1993) and Jennifer Abbott, ed., *Making Video In: The Contested Ground*

of Alternative video on the West Coast (Vancouver: Video In Studios, 2000); in Calgary, a publication marking a twenty-five year history will be published in the next year by EM/Media, a video production collective.

7. See program description for *Flesh Eating Technologies*, December 06 - December 07, 1997, Banff Centre, in the program archive at the Banff New Media Institute site: <http://www.banffcentre.ca/bnmi/programs/archives/1997/flesh_eating/default.aspx>. Also see the web archive within the Walter Phillips gallery, for the exhibition, *The Art Formerly Known As New Media*, September 17 to October 23, 2005, <http://www.banffcentre.ca/wpg/exhibitions/2005/formerly/>.

8. Michael Snow's film-notes describe his intentions around the use of a camera within a machine apparatus: "The first 30 minutes show us the four people who have set the camera and machine in motion doing various things, talking, looking, but after that we are gone and the remaining two and a half hours is entirely made by the machinery (you?). There are no other people but you (the machinery?) and the extraordinary wilderness. Alone. Like a lot of other humans I feel horror at the thought of the humanizing of the entire planet. In this film I recorded the visit of some of our minds and bodies and machinery to a wild place but I didn't colonize it, enslave it. I hardly even borrowed it. Seeing really is believing." from notes on the film, *Film Forum, Los Angeles, <http://www.lafilmforum.org/past/spring2005/4_10/4_10.html>*.

9. Peter Neuman and William Burnette from Bell Labs, along with artist filmmaker, Hollis Frampton, are credited with the development of the text permutations (film credits, *Reason Over Passion*, 1969, available from Canadian Filmmakers Distribution Centre in Canada).

10. See this video clip of Steina Vasulka discussing the work, *Machine Vision* (1978), which she describes coming out of a series of experiments: "In the late seventies, I began a series of environments titled *Machine Vision* and *Allvision*, with a mirrored sphere. Another variation has a motorized moving mirror in front of the camera so that depending on the horizontal or vertical positioning of the mirror, the video monitor displays a continuous pan or tilt either back/forth or up/down. A third variation is a continuous rotation through a turning prism, while still another has a zoom lens in continuing motion, in/out. These automatic motions simulate all possible camera movements freeing the human eye from being the central point of the universe." From the Vasulka archive, <http://www.vasulka.org>, in the section, "Steina," "Machine Vision," < http://www.vasulka.org/Steina/Steina_MachineVision/MachineVision.html>.

11. For a description of the tool, the Paik/Abe synthesizer (1969), which plays with the video signal, along with a history by George Fifield of the experiments of WGBH TV with artists using television as a medium, see the weblink for the Experimental Television Centre Video History Project, <http://www.experimentaltvcenter.org/history/tools/ttool.php3?id=29&page=1>. George Fifield describes the innovation of the Paik/Abe synthesizer and Paik's poetic impulses: "Until Nam June Paik the medium of worldwide broadcast television was the engineer's temple. Artists were not invited. Yet by 1970, this 'vast wasteland,' as it was called, had transformed our culture, becoming the most powerful form of communication in the world. Paik revolutionized that. The handful of videos he made with the Synthesizer had an effect far beyond their audience. Suddenly the idea of video art made sense in a way that it hadn't before. Video became a canvas that the artist could literally paint on. The freedom of creative thought that Paik's creation spawned spread like wildfire. The Paik/Abe synthesizer and others like it were used by an entire generation of artists interested in the formal beauty of the abstract video image. Suddenly artists started inventing new electronic tools as fast as they needed them, twisting video signals through a whole new language of feedback and colorization, processing and disruption."

12. See Lev Manovitch's website for essays towards a book, possibly titled, *Understanding Metamedia*, in particular, two essays on After Effects, "After Effects or Velvet Revolution in Modern Culture, part I and part II," < http://www.manovich.net/>.

13. Wieland's film works stretched the category of what can be seen as the canon of 'structural' film; discussions can be found in two books, Kathryn Elder, ed., *The Films of Joyce Wieland* (Waterloo, Ontario: Wilfred Laurier University Press, 1999); and Lauren Rabinovitz, *Points of Resistance: Women, Power and Politics in the New York Avante-Garde Cinema, 1943-71* (Urbana, Illinois: University of Illinois Press, 1991).

14. In conversation with John Oswald, December 8, 2006, Ottawa; also see a description and a clip of John Oswald's *L'Arc d'Apparition*, Chronophonic DVD, 2004, which describes "chronophonics" in his music label website, Fony, as "a time-based chiaroscuro, or light/shade technique and hundreds of layers of cells or transparencies to keep his pictures constantly changing while remaining motionless." For a clip, see <http://www.pfony.com/chrono/index.html>.

15. David Rokeby project site, Notes on *Seen*, < http://homepage.mac.com/davidrokeby/seen.html]>.

16. The exhibition at ZKM, *CTRL [space]: Rhetorics of Surveillance from Bentham to Big Brother*, October-February 2002, is well documented in the ZKM web archive, < http://ctrl-space.zkm.de/e/>. A book project came out of the exhibition: Thomas Levin, Urusla Frohne, Peter Weibel, eds. *CTRL [SPACE]: Rhetorics of Surveillance from Bentham to Big Brother* (Cambridge, Massachusetts: MIT Press, 2002).

17. Paul Landon, *Intérieurs: Walter Benjamin and the Paris Arcades [Photo book project], Extérieurs: Paris 2001 [DVD] (Montreal: P.Landon editions*, 2002).

18. Susan Buck-Morss' essay, " Aesthetics and Anaesthetics: Walter Benjamin's Artwork Essay Reconsidered," works through the political implications of Benjamin's work, reminding the reader of the phenomena, "Beginning in the nineteenth century, a narcotic was made out of reality itself" (394), within a discussion of "phantasmogoria," the body, and the state in Rosalind Krauss et al, eds. *October: The Second Decade, 1986-1996 (Cambridge, Massachusetts: MIT Press, 1997), 375-413.*

19. For reference to cycling within media artworks, see Rodney Graham's *Phonokinetoscope* (2002), in which he took a tab of LSD while cycling through Berlin's Tiergarten, invoking the LSD experiments of Swiss chemist Albert Hoffman in 1943, documented in the exhibition catalogue, Grant Arnold, Jessica Bradley, and Cornelia Butler, eds., *Rodney Graham: A Little Thought* (Toronto, Los Angeles, Vancouver: AGO, MOCA, VAG: 2004), 34, 86-91. See also, the cycling work of Jeffrey Shaw and Dirk Groenvoeld, *The Legible City* (1998) in which the viewer navigates on an actual bicycle within the gallery through the artwork, a journey through a city of words, documented in Ingo Walther, ed., *Art of the 20th Century,* Volume II (Köln: Taschen, 2005), 616.

20. Gordon Matta Clark, *City Slivers* (1976, 16 mm color film, 15 min., silent).

21. Over the year, 2005-2006, I worked as a Distinguished Visiting Scholar in the Interactions Lab at the University of Calgary's Computer Science Department which houses the work of Dr Sheelagh Carpendale (Information Visualization) and Dr Saul Greenberg (Human Computer Interaction and Embodied Interaction). In the two labs (i-lab and the Jungle), I worked with two graduate students, Joseph Cherlin, who programmed what became the "My 2 Grandmothers RMX/Tulipomannia" art-work in C++ and who worked as a researcher, along with another graduate student who made research contributions, Mike Nunes.

22. Notes by Joseph Cherlin, as part of the research project, University of Calgary, 2005-2006.

23. Ibid.

24. The Banff New Media Institute (BNMI) CAVE is a passive stereo environment where the *Tulipomania* project display problem could be observed, and thus resolved, allowing us to work further with the spatializing of audio and video projections.

25. Lantin has been Director of the Interactions Lab at the Emily Carr Institute of Art + Design since September 2006.

26. Mike Nunes, Visual Traces, i-lab cookbook web archive, <http://grouplab.cpsc.ucalgary.ca/cookbook/index.php?n=Demos.VisualTraces>.

27. From an email from Ruth Scheuing (May 4, 2006): "I have long been intrigued by Leila Sujir's work. "The Two Grandmothers," which I saw as a high tech quilt that moved. It was clearly grounded in the world of pattern and textiles, particularly exotic bright and colourfull patterns and women's work. I loved how the repeats would move into sequences, sometimes creating well established patterns and borders and then suddenly trailing off into narratives or completely different large collage like compositions. At the same time it was not quite as safe and comforting as a traditional quilt. This movement throws textiles in a new and technological dimension. To me this shows both a connection with the past and the future." My own (Ruth Scheuing's) work is grounded in textiles as a language that speaks of old stories, from

traditional myths and fairy tales to current trade issues and technology. I am interested in patterns, repeats and movement, specifically flowers represented as patterns in textiles. Today with the Jacquard loom, ancient weaving technologies can be combined with computers and industrial production modes to produce work that destabalizes (hopefully) a myriad of assumptions. Ruth Scheuing's works have been exhibited in North America and Europe. Her writings have been published in various places and she co-edited a book of essays entitled *material matters*: *the art and culture of contemporary textiles*. Currently she teaches in the Textile Arts Program at Capilano College in North Vancouver.

28. Nicole Mion, choreographer of an exploration of narrative within the *My 2 Grandmothers RMX/Day-old Venice/Cycling outside Leiden*, with *Muscled Memories 1* within the gallery space at the Art Gallery of Calgary, July 6, 2006, and *Muscled Memories 2* within the CAVE space at the ART Lab, Banff New Media Institute, Interactive Screen, August 18, 2006, with performers Kimberly Cooper and Eric Rose.

29. Robert Filliou, *Permanent Creation Tool Shed* (1969) and *Permanent Creation Tool Box* (1969) documented in Ingo Walther, ed., *Art of the 20th Century, Volume II* (Köln: Taschen, 2005) 522 and 589; Robert Filliou was in Canada as an artist-in-residence at the Parachute Centre for Cultural Affairs in the mid 1970's, where I was fortunate, as a young artist, to encounter him.

30. Rosalind Krauss, *The Originality of the Avant-Garde and other Modernist Myths* (Cambridge, Massachusetts: The MIT Press, 1985), Chapter 2 "In the Name of Picasso," pg.38.

31. Leila Sujir, Artist Statement, unpublished notes, May 2006.

32. *The Originality of the Avant-Garde and other Modernist Myths*, Chapter 2 "In the Name of Picasso," pg.38.

33. A quote from one of the participants: "…this is the first time I saw a projected or flat image as a three dimensional object, I was actually perceptually fooled and quite disoriented. I KNEW that this object was in the plane of the wall, however I actually felt that I could reach out and touch the object (I think it was a jetliner) and move it as if the wall plane was mutable and lacked dimensionality. In terms of detail, the image was very hard to pin down (in fact the image was very DARK, almost unaturally so) It was quite disturbing really." Email from Patrick Harrop (Professor, Department of Architecture, University of Manitoba), February 2007.

34. Of note is the German group Rostlaub that created 99 photographic interactive rooms that can be navigated in Flash: <www.99rooms.com>

35. Eric McLuhan, *Electric Language: Understanding the message* (New York: St. Martin's Press, 1998).

IMAGES CREDITS

Figures 1 & 3 : i-lab cookbook. Interactions Laboratory researchers maintain a 'cookbook' that collects software, toolkits and documentation at <http://www.cpsc.ucalgary.ca/grouplab/cookbook/>. © University of Calgary.

Figures 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 & 15 : All rights reserved © Leila Sujir. Courtesy of the artist.

BIOGRAPHIES

Leila Sujir is an artist and a professor at Concordia University in the Intermedia Cyberarts (IMCA) program of the Studio Arts Department with a background in visual and media arts production and theory. Over the previous year, she was a Distinguished Visiting Scholar at the University of Calgary, a one year research position as an artist in the Interactions Lab in the Department of Computer Science, completing the end of August 2006. *My Two Grandmothers RMX/Tulipomania*, an interactive video installation working with a tabletop interface, is a project which culminated from the year at the Interactions Lab and as a co-production in the Banff New Media Institute, exhibited at the Art Gallery of Calgary, June through September 2006. Sujir's video art works, both sculptural pieces as well as works which can be shown on a screen or a television, interlace narrative into the time and space of video, working with various poetic forms, biography, autobiography, and history, working with story as one of the threads shaping our lives. A solo exhibition which has toured Canada, "Luminous Stories," initiated by the Art Gallery of Peterborough, covers the last ten years of her video production. Her video works have been shown in group shows at the Museum of Modern Art in New York and the Tate Gallery in Liverpool, U.K. as well as galleries and festivals all over the word. "New Republics," a group exhibition out of the U.K. recently toured Canada and Australia. Her video works are in a number of collections, including the National Gallery of Canada which own four of her works, starting with productions from the mid-eighties through to the present. Sujir's video work has also been shown on educational television in Canada. Her previous project, *For Jackson, A Time Capsule*, (2003) supported by five Canadian broadcasters as well as the National Film Board, came out of an earlier installation, a working process which allows art projects to take shape and develop as they move through various media.

k.g. Guttman is a Montreal-based artist who works in performance, dance, drawing, and video. As a professional dancer, she worked as a full-time company member for Le Groupe Dance Lab in Ottawa from 1999-2003, and currently freelances for choreographers such as Lynda Gaudreau, Louise Bédard, Sarah Bild, among others. Awarded the Brian Webb Choreographic Prize in 1997, her subsequent choreography has been presented across Canada including the Canada Dance Festival 2000 and 2004, Ottawa, Tangente, Montreal, as well as internationally at the loft, Brussels, DasArts, Amsterdam, and the University of Sonora, Mexico. k.g. was artist-in-residence at Studio Flak – José Navas in Montreal, in 2005 and invited artist to work in CLASH, a choreographic lab directed by Lynda Gaudreau, Montreal, 2006. Her drawing and print work has been exhibited through the RAM Foundation Gallery in Rotterdam, the Bourget Gallery, and Galerie La Centrale in Montreal. She has produced videos through residencies at Daimon, Gatineau, La Bande Vidéo, Québec City and Saw Video, Ottawa, which have been screened across Canada and internationally. k.g. was awarded the Dennis Turbin Emerging Artist Award in 2001 by Saw Gallery, Ottawa for her performance in Blast National Performance Art Festival. k.g. is currently pursuing her M.F.A. at Concordia University in Montreal, and has studied at the reputed school DasArts, Advanced Studies in Performance, Amsterdam. In 2007/08, she will participate in a residency for young artists at the Pavillon, Palais de Tokyo, in Paris.

Maria Lantin is the Director of the Intersections Digital Studio, a new research space at the Emily Carr Institute of Art and Design. Prior to coming to Emily Carr, Dr. Lantin led the Visualization Lab within the Advanced Research Technology (ART) Labs at The Banff Centre. She was granted her PhD in Computing Science by Simon Fraser University (SFU) in 1999. Alternating between academia and industry for a number of years, she has previously worked as a senior developer at Mainframe Entertainment, an assistant professor at the Technical University of British Columbia (now SFU), and the Director of Research at IDELIX Software Inc. In her role of Director of the Intersections Digital Studio, Maria is helping create an inspiring and welcoming environment for interdisciplinary research at the Emily Carr Institute of Art + Design. She also continues her collaborative visualization practice in the domains of quantum information science, human conversation and virtual reality.

RÉSUMÉ

TECHNO WHISPERS
Leila Sujir en collaboration avec Joseph Cherlin et Mike Nunes

CONTEMPORARY COLLAGE IN THE WORKS OF LEILA SUJIR: "MY TWO GRANDMOTHERS RMX; TULIPOMANIA.1, DAY-OLD VENICE; TULIPOMANIA.2, CYCLING OUTSIDE LEIDEN"
k.g. Guttman

NOTES TOWARDS TULIP THEORY
Maria Lantin

La problématique de *Techno Whispers* s'articule autour d'une approche du «nouveau» par le biais d'une prise de conscience, de la place qu'il occupe sur un tableau chronologique, de sa place dans les archives, ou de l'*ancien* – un processus de récupération d'archives – soit par un logiciel, soit dans le cadre du processus de recherche en art ou en science (informatique).

Ce projet a mis à contribution des méthodologies de recherche et des voix fort distinctes dans le domaine de l'art et de la science informatique. Étant donné qu'il s'agit du premier document à décrire le projet de recherche-création, j'ai demandé à deux de mes collaboratrices, k.g. Guttman, une étudiante au second cycle, et Maria Lantin, une informaticienne spécialisée en visualisation de l'information, de commenter le processus dans lequel nous nous sommes engagés. Nous avons nommé ce projet *Tulip Theory*. k.g. a étudié à la Das Arts d'Amsterdam dans le cadre de son programme de Maîtrise en beaux-arts de l'Univeristé Concordia. Maria était responsable du Laboratoire A.R.T. de la Banff New Media Institute (BNMI) où j'ai amorcé la recherche dans le Laboratoire Interactions avec les professeurs Sheelagh Carpendale et Saul Greenberg de l'Université de Calgary. Maria est maintenant directrice du Laboratoire Intersections au Emily Carr Institute of Art + Design. Joseph Cherlin et Michael Nunes, deux étudiants au second cycle du Département d'informatique de l'Université de Calgary, ont contribué à la recherche pour le volet informatique du projet. Aussi, des publications à venir qui s'articulent autour des processus scientifiques et artistiques seront envisagées, plus particulièrement, sous l'optique d'une étude de cas à caractère scientifique.

La réorientation des technologies peut s'avérer une stratégie axée sur l'*inédit* ou sur l'*innovation* comme dans le cas des collaborations d'artistes-ingénieurs (Michael Snow, Joyce Wieland, Woody et Steina Vasulka). Une partie du processus de recherche consiste à regarder sous la surface, à scruter l'appareil – appareil photo, table de montage ou logiciel qui *construit* l'œuvre – et à étudier les nombreuses décisions rattachées à ces choix. La façon dont un artiste ou un collectif décide de résister aux capacités d'un appareil ou d'un logiciel peut devenir un mouvement identifiable, ou une façon d'exploiter le dispositif comme instrument de narration (le travail du chercheur Paul Landon sur *City Sliver*, film de Gordon Matta Clark).

k.g. Guttman écrit sur l'apparence ou la surface de *Tulipomania* en inscrivant le terme *collage* dans le discours de l'Histoire de l'art. La nouvelle œuvre, *Tulipomania*, est un phénomène évolutif, fondée des observations plus poussées et comprenant des approches plus formelles, qui contribueront grandement à son exploration.

Maria Lantin se penche sur les aspects de l'œuvre mettant en valeur l'utilisation de la technologie du projet CAVE de façons novatrices et avec des effets surprenants. Par exemple, elle souligne le refus des trois mondes virtuels au sein de la *Tulip Theory* « d'immerger » le spectateur à l'aide des techniques spatio-temporelles du projet CAVE. Cette non-immersion a été juxtaposée à un usage gradué et déformé de certaines techniques traditionnelles du projet CAVE comme la projection stéréoscopique, la position et l'interactivité d'objets virtuels 3D, créant ainsi un environnement qui fait référence à l'ancien sans s'y conformer. Elle aborde également le processus de la création d'une œuvre issue de l'association entre artistes et scientifiques, faisant appel à son expérience de collaboration similaire pour commenter la situation actuelle et l'éventuelle fusion des disciplines.

En résumé, la convergence des trois points de vue vise à prêter des voix différentes à un même matériau et à contextualiser le processus de recherche de ce projet.

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