fourth international symposium on electronic art

ISEA

the art factor:

Abstracts and Artist Statements

Minneapolis, Minnesota U.S.A.
November 3 – 7, 1993

FISEA

fourth international symposium on electronic art

FISEA 93 is hosted by the Minneapolis College of Art and Design, in affiliation with the Inter-Society for the Electronic Arts:

Minneapolis College of Art and Design
2501 Stevens Avenue South
Minneapolis, Minnesota 55404 U.S.A.
Telephone: (612) 874-3754
Email: fisea93@mcad.edu

ISEA
P.O. Box 8656, 3009 AR Rotterdam, Netherlands
Telephone: 31-10-2020850, 31-79-612930
Fax: 31-79-611737
Email: isea@mbr.frg.eur.nl (Board) or isea@sara.nl

Contents

FISEA 88, Utrecht, Netherlands / **SISEA 90,** Groningen, Netherlands / **TISEA 92,** Sydney, Australia / **FISEA 93,** Minneapolis, U.S.A. / **ISEA 94,** Helsinki, Finland / **ISEA 95,** Montreal, Canada

FISEA 93 IS ENDORSED BY:

ISEA	Inter-Society for the Electronic Arts
ISAST	International Society for the Arts, Sciences & Technology
ANAT	Australian Network for Art and Technology
YLEM	Artists Using Science and Technology

FISEA 93 INTERNATIONAL PROGRAM ADVISORS:

*Roy Ascott (U.K.), *Peter Beyls (Belgium), Annick Bureaud (France), *Jürgen Claus (Germany), Emanuel Dimas Melo Pimenta (Portugal), *Greg Garvey (Canada), Ross Harley (Australia), *Craig Harris (U.S.A.), Theo Hesper (Indonesia), Errik Huhtamo (Finland), Itsuo Sakane (Japan), John Lansdown (U.K.), Nadia Magnenat-Thalmann (Switzerland), *Roger Malina (U.S.A.), *Artemis Moroni (Brazil), *Simon Penny (U.S.A.), *Wim van der Plas (Netherlands), Stephen Pope (U.S.A.), Cynthia Rubin (U.S.A.), Christine Schopf (Austria), *Rejane Spitz (Brazil), Minna Tarkka (Finland), Philippe Queau (France), *Yoshiyuki Abe (Japan)

** FISEA 93 presenter or plenary session officer*

PROGRAM DEVELOPMENT:

Program Director: Roman Verostko, Professor, Minneapolis College of Art and Design / **Program Committee Coordinator:** Dr. Alice Wagstaff, Psychologist / **Senior Consultant:** Dr. Lloyd Ultan, Music Department, University of Minnesota

EVENT CHAIRPERSONS/CURATORS:

Sound Performance Events/Listening Chamber: Dr. Homer G. Lambrecht, Composer, MIDI Instrumentalist and Associate Professor, University of Wisconsin-River Falls / **Electronic Theater and Interactive Art Exhibits:** Dr. Scott A. Sayre, Manager of Interactive Media, Interactive Media Group, The Minneapolis Institute of Arts / **Gallery Installations/Exhibition:** Brian Szott, Gallery Director, Minneapolis College of Art and Design / **FAX Art Exhibits:** Craig Ede, Artist and Teacher / **Slide Show:** Judith Yourman, Artist and Assistant Professor, St. Olaf College

PROGRAM SUPPORT SERVICES:

FISEA Workshop Coordinator: Beth Giles, Continuing Studies Program Coordinator, Minneapolis College of Art and Design / **FISEA Publications Editor:** Susan V. Hanna-Bibus, Grants Manager, Minneapolis College of Art and Design / **FISEA Computer Services:** Andrew B. Mickel, Computer Center Director, Minneapolis College of Art and Design / **FISEA Equipment Manager:** Bradford Smith, Media Center Director, Minneapolis College of Art and Design

credits

ADMINISTRATION:

Executive Director: Andrea Nasset, Interim Academic Dean, Minneapolis College of Art and Design / **Executive Assistant:** Joan F. Klaiber, Office of the President, Minneapolis College of Art and Design / **Minneapolis Community Liaison:** Phill Lindsay, Arts Economic Development / **Data Management:** Charles J. Swiszcz, Director of 3-D Shop, Minneapolis College of Art and Design / **Public Relations:** Anastasia S. Faunce, Public Relations Director, Minneapolis College of Art and Design

SPECIAL THANKS TO:

Dana M. Brodt, Millesande Charles, Lisa Daehlin, Mark Feyereisen, John Fillwalk, Linda Fisher, Jan Zita Grover, Bill Haman, Brent Hamilton, Bruce Jenkins, Larry Lamb, Barry McMahon, Thomas E. Morin, Russ Mroczek, Richard Mueller, Aribert Munzner, Richard Paske, Anthony Riddle, Neil Seiling, Linda Shapiro, Michael Simmons, Steve Solum, Mark Stanley, Vern Sutton, Alex Tylevich, Fred Zinn

FISEA 93 IS PRESENTED IN PARTNERSHIP WITH:

Minneapolis Community College / The Minneapolis Institute of Arts / Minneapolis Hilton and Towers / University of Minnesota / Walker Art Center

FISEA 93 IS MADE POSSIBLE THROUGH THE GENEROUS SUPPORT OF:

Apple Computer, Inc. / Bolger Publications and Creative Printing / Cisco Systems, Inc. / Crash and Sue's / Cray Research, Inc. / Dennis Fazio, The Minnesota Regional Network Corporation (MRNet) / Hendrick's Pianos, Edina with special thanks to Ralph Bauer and Bob Hogan / Lamb & Company / 3M Company / Northwest Airlines, Inc. / ProColor, Inc., a full service digital imaging center and custom photo lab / Roger Dodger Music with special thanks to Roger Dumas / Schilling Travel / Silicon Graphics, Inc. / Weyerhaeuser Paper Company / Yamaha Corporation of America, Keyboard Division / Zeos International, Ltd.

PUBLISHED BY:

The Minneapolis College of Art and Design

DESIGNED BY:

Joseph D.R. O'Leary, Veto Design, Minneapolis

PRINTED BY:

Bolger Publications/Creative Printing (a special thanks to Janet Rensberger)

All information included in this catalogue was accurate and complete at the time of publication to the best of the editor's knowledge.

FINE (P)ARTS

Alex Tylevich, Symposium Identity (poster and introductory animation) Rationale

"The Art Factor" is the focus of the symposium, with the merging of art and technology (the flesh/prosthesis – ir/rational dualism) as a key topic for dialogue.

The "unsure-of-its-identity" body becomes the center of attention in art. Technology used to enhance the body also determines to some degree what the body should be (an object? a piece of equipment? an artwork?). Enabled by science, the artist's territory is expanding to the medium of life itself (artificial intelligence, Wetware, virtual worlds). The body loses its definition, becoming a refractive medium through which science and art explore and question each other.

Anonymous, wired Christ-head immersed in fluid tissue — the human/machine hybrid "icon" — as the brutal reconciliation site.

"The Art Factor" may be interpreted as enhancing the technological interface with feeling, emotion, and other human qualities, and, at the same time, empowering artists with new technologies. An unknown territory lies where emotional machines meet the artist-cyborg. The language of the emerging culture needs yet to be defined, as the struggle to accommodate the machine continues.

introduction

Roman Verostko, program director, FISEA 93

The focus at the 1993 ISEA has been THE ART FACTOR. From the beginning the program committee, recognizing that the clamor of new technologies too easily takes center stage, centered its interest on artistic procedures and information-processing by artists. The "Call for Participation" identified the need for more focused dialogue on the emerging artist/machine dialectic in terms of arts criticism. This new cultural frontier has been changing the way we experience and interact with our world. Clearly our "machine culture" will come to maturity by cultivating, celebrating and integrating "art," both intentionally and qualitatively.

The artistic work of the cyber culture manifests itself as a new edge preceding any art theory or criticism about itself. For this reason we see a need to draw those involved with this new edge into a more focused sharing and discussion about their "art," both in theory and in practice. So FISEA 93 has been orchestrated to foster dialogue on the "art factor," especially for those younger artists who have grown more with joy sticks than with paint brushes. The intention has been to promote a greater understanding of both the formal aspects of the work and its technology.

In keeping with our theme the "Call" explicitly invited work which the submitters considered to be "art," thus providing ground to discover "the art factor" through the window of submissions. The very process of hundreds of artists, theorists and scientists pondering the issues and preparing submissions would provide the substance for dialogue at this symposium.

Why must we address the critical language and the criteria we use for the "art" of this "machine culture"? Our relation to each other, the world and the things we make are being radically transformed as "ubiquitous computing" invades our lives. This radical transformation includes deep-level changes in how we create and talk about cybernetic art. From networks and form generators to genetic algorithms and computer viruses we see artists using technologies that challenge assumptions about the "hand" of the artist, original art, individual style and private expression. Shall we call "this" art? Where does it reside?

While the "modern" dogma has served its time well its critical language and assumptions pertain to a passing culture where cybernetics was the stuff of science fiction. The "modern movements," like fashion, were in a dialectic with their predecessors; "art on art," as it were. But those artists who have pioneered the stuff of cybernetics have come to us somewhat sideways, intensely involved with the interaction between humans and machines. The whole range — from networks to artificial life — has seduced many to total commitment. This includes a growing number who come directly out of the sciences crossing over to the world of art.

What draws them? How are we to assess their work? The artists' statements in this catalogue and the works they represent provide a ground for wrestling with these problems. This ISEA series has been evolving terminology and formal categories for reviewing and exhibiting art which has many labels and faces — cyber art, electronic art, computer art, digital media. Because of the interdisciplinary nature of the work the categories tend to blur and cross over each other.

So submissions have had to be passed around and pondered. Whose expertise pertains to this paper, to this work of art or to this project? How do we exhibit this? What kind of equipment will we need and how do we get it done? Is it feasible? Too often, it seemed to us, the limits of time, money and resources placed unwanted restrictions on our choices. Yet, even within the severe limits of the possible and the overlapping categories the shape of the exhibits and the symposium gradually emerged.

This catalogue documents the yield of the process outlined by the Program Committee nearly two years ago. Yet it is but a token of the exhibitions and papers, which in turn are both the fruit and the stimulus for those with a common interest coming together to share their visions, problems and aspirations. For many attendees at the first ISEA Symposium (Utrecht, 1988) — and subsequently — *the* discovery has been how many have traversed a similar path.

Always, the shape of these symposia is defined by the participants, not just those who present papers or exhibit, but by all who submit, and all who come and take part in the discussions, both public and private. Juries and committees make it possible to come together in a meaningful way, but it is those who come and participate who create the substance and meaning of the symposium as it unfolds, and lay ground for the next. So the process yields one ambiance in Sydney, another in Minneapolis, and we may expect yet another in Helsinki in 1994 and in Montreal in 1995.

Behind the scenes, thanks!

Behind the scenes in all of these symposia are those whose dedicated work makes all this possible. Most important of all has been Alice Wagstaff, my wife, who coordinated the Program Committee, assisted in implementing the screening of papers and panels, edited my writing, managed the Email and salved my wounds for the past year and a half. Her firm and unfailing support at the age of 74 will give many younger participants hope for the future!

We owe much to Lloyd Ultan, University of Minnesota, whose experience helped shape a meaningful "Call for Participation." Following serious surgery and months of uncertain health Lloyd has given generous counsel and support even as he recuperates.

All of us are indebted to the Chairs who shouldered the enormous task of screening the submissions with an eye to generating a diverse, representative and meaningful show of work in their respective areas. This includes especially Scott Sayre, the Interactive Media Group at The Minneapolis Institute of Arts, for his playful spirit and creative work on the Electronic Theater and the Interactive Art works; Homer Lambrecht, University of Wisconsin-River Falls, for magical patience with the physics of time and space as he worked out the Sound Performance Events; Brian Szott, Minneapolis College of Art and Design, for his sound advice and commitment to the Gallery Show; Bradford Smith, Minneapolis College of Art and Design, who treaded where angels feared as he assumed responsibility for equipment; Craig Ede who brought an energized spirit to curating the FAX Arts program; and Judith Yourman, St. Olaf College, who worked generously in curating the slide show.

On the administrative side the greatest credit must go to Joan Klaiber our Executive Assistant who, besides being assistant and right arm to the president of the Minneapolis College of Art and Design, managed the FISEA office, registration and the hundreds of related details. She has wrought marvels with limitations of resources and space. Andrea Nasset, Interim Academic Dean of the Minneapolis College of Art and Design and Chair of the FISEA Steering Committee, took on the big ones cheerfully and saved the day, time and again. Early in the planning stages I received important counsel from Susan Hanna-Bibus, Minneapolis College of Art and Design, who also has made a major contribution as Editor of FISEA publications. Thanks, too, to Beth Giles, Minneapolis College of Art and Design, who has coordinated the Workshops.

We are especially grateful to Wim van der Plas (Inter-Society for Electronic Art) who wisely and patiently guided us through this project, especially in its initial stages when things seemed so uncertain. Along with him we thank the many international advisors from over twenty countries who have helped us. We particularly note the contributions of Peter Beyls, Belgium; Yoshiyuki Abe, Japan; Artemis Moroni and Rejane Spitz, Brazil; Gary Warner, Ross Harley and Alessio Cavallaro, Australia.

We especially thank Roger Malina (*Leonardo*, ISAST) who recommended us to Wim van der Plas and has supported this and the other symposia from their beginnings. Thanks to him and Craig Harris (*Leonardo*) for their generous help and counsel.

Finally the one person, above all, who made this symposium possible has been John S. Slorp, President of the Minneapolis College of Art and Design, who has made College resources available as much as possible. His moral support, counsel and willingness to go the extra mile bolstered the ISEA series at a time when support for the series was waning.

For all these good people, including our many exhibitors, contributors and helpers, we say thank you for making FISEA 93 possible.

Roman Verostko, an artist and art historian, teaches world art history at the Minneapolis College of Art and Design. As a Bush Fellow he researched the "changing role of artists" at the Center For Advanced Visual Studies at MIT (1970). His seminal paper *Epigenetic Painting: Software as Genotype* (1988) identified biological analogues to autonomous form generating procedures. His "epigenetic art" includes a limited edition of George Boole's *Derivation of the Laws...* illustrated with his own "personal expert system." He received an Ars Electronica honorary citation this year and was included in *Genetic Art - Artificial Life* (Lintz, 1993). Other shows include: *TISEA* (Sidney, 1992), *Dada Data: Developing Media Since 1970* (Baltimore, 1991), *Interface: Art & Computer* (New York, 1991), *El Art* (Finland, 1991), *The Technological Imagination: Machines in the Garden of Art* (Minneapolis, 1989).

04

abstracts
papers
panels

ART/TECH COLLABORATIONS: some tips on getting along

essay by BRENDA LAUREL

Address: Interval Research, 1801 Page Mill Road, Building C, Palo Alto, CA 94304 U.S.A.
Telephone: (415) 354-0882; Fax: (415) 354-0872

You have to fall in love. Not necessarily with each other, although that helps — but with a vision of what you are trying to do together.

Mistress of brushes, catgut physicist, ballet biomechanic — every artist's practice involves rigor, knowledge, precision and curiosity. Painter of light, code composer, algorithmic alchemist — every technologist's practice involves beauty, harmony, intuition and protean transformations. We are more alike than we are different.

Somebody has to be on top. Like directing for theatre, the central task is creating the shared vision. Good guidance in visioning means getting people with vastly different skills to see pictures of the finished whole that converge as they work on it. First, agree on how it looks, tastes, feels. Then go away and apply individual expertise to describe how it is made. Come back and explain it to one another. Iterate.

Collaborative process and leadership are not mutually exclusive. Know when it is time to make a decision. Make it.

Bad communication will kill you — not listening to people with different expertise than yours, not bothering to translate your ideas into a common tongue, thinking you are a specialist, being secretive or territorial. The flipside: thinking it's not your business and holding your peace, avoiding conflict by avoiding communication, being afraid to ask stupid questions, waiting to express yourself until you're angry or alarmed.

The most important thing you will do together in the course of any project is to design tools. The technologist's tool seems indirect and arcane. What is he seeing when he uses it? The artist wants a capability that seems uncomfortably obscure. What kind of precision is she seeking?

Good tools will be there long after the piece is forgotten and the team is dissolved. They will influence the medium more strongly than any individual piece ever could. Good tools are the enduring fruit of successful collaborations.

THE PLACE IS ART

essay by JAN HOET

Director, Museum of Contemporary Art, Gent
President, International Association of Art Critics
Artistic Director, *Documenta IX*, Kassel, 1992
Address: Museum Van Hedendaagse Kunst Gent,
Citadelpark, B-9000 Gent, Belgium

For a long time I have been sometimes fascinated and involved, but more often annoyed by the use of electronic media in art. The annoyance was such a frequent experience and reached such heights that I tended to refuse to enter into discussions about the place of electronic media as a whole. Rather, I engaged individual artists. "The place is art," I said. The basic reference for me remained the one to painting and its disposition to extend beyond itself. In *Documenta* quite a few of the referential pieces were actually videoworks. Their attitude was one of enveloping the observer rather than encountering him.

A medium can only become a message when it is internalized. Every new area needs time to become familiar. In its first phase the power of the inherent possibilities is often overwhelming, and most of the people using it are adepts of the technology rather than artists for their own sake. At the same time there are the true pioneers, developing a sensible indication of the possibilities, intertwining the medium with their own subjectivity and intersubjectivity. The paradigms, then, often remain linked to another area, like the first ceramics to the calabash.

This period seems to be over for many of the areas of electronic possibilities, now legitimized areas in their own right. The glamour of the novelty is no longer the prime seductive adventure.

abstracts papers panels

REDEFINING THE STATE OF THE ART

MARGO K. APOSTOLOS, Ph.D.

Choreographer and researcher

Address: School of Theatre, University of Southern California, Los Angeles, CA 90089-0791

Robot Choreography, a method of programming robots to dance, explores the aesthetic implications of robotic movement. This work, integrating human and robot performers on stage and in video, has met with a mixed reaction. Acceptance and anxiety issues raised by robots in our society now apply to the world of art, as the technology spills over into creative venues. Clearly, performers and audiences must be prepared and reeducated to fully comprehend and appreciate the value of technological innovations.

Robot Choreography provides an exemplary case of how computer and robot technology has expanded the role of the artist and the audience. Robot performances illustrate that a real robot (programmable, intelligent and dexterous machine) is able to communicate and express feelings to an audience. Industrial robots, programmed to capture graceful and humanlike gestures, are cast as dancers and actors in various performances. Seemingly, a machine comes to life on stage.

Integrating art and technology can provide a new look at the same world: art utilizes science and science recognizes art. As our world becomes integrated with new technology, the human response must grasp a reality beyond the novelty of mere illusion and imagination. The intention of merging the worlds of art and science is *not* to replace the artist but, based on skill and technique, create a new form of expression.

FROM APPEARANCE TO APPARITION: communications and consciousness in the cybersphere

ROY ASCOTT

Director, the Centre for Advanced Inquiry in the Interactive Arts (CAIIA), Newport School of Art and Design, Gwent College, Wales

Address: 64 Upper Cheltenham Place, Bristol, U.K. BS6 5HR

Telephone: 0272-550151; FAX: 01016128743732

Art in the cybersphere is emerging out of the fusion of communications and computers, virtual space and real space, nature and artificial life, which constitutes a new universe of space and time. This new network environment is extending our sensorium and providing new metaphysical dimensions to human consciousness and culture. Along the way, new modalities of knowledge and the means of their distribution are being tested and extended. Cyberspace cannot remain innocent, it is a matrix of human values, it carries a psychic charge. In the cyberculture, to construct art is to construct reality, the networks of cyberspace underpinning our desire to amplify human cooperation and interaction in the constructive process.

HOLOGRAPHY AND THE LANDSCAPE TRADITION

RENÉ PAUL BARILLEAUX

Director of Exhibitions and Collections/Chief Curator, Mississippi Museum of Art

Address: 201 East Pascagoula Street, Jackson, MS 39201 U.S.A.

Telephone: (601) 960-1515; Fax: (601) 960-1505

In painting, photography, installation and video, artists throughout history have turned to the landscape and nature-based imagery as their source of inspiration, the subject of their explorations and more recently, the material of their art itself. Now holography is another artistic medium being used to explore the connection between art and nature and as such poses interesting juxtapositions between technology-based art and nature.

The increasing visibility of this art, through exhibitions of the work of artists such as Rudie Berkhout, Setsuko Ishii, Dan Schweitzer, Martin Richardson, Betsy Connors, and collaborators Susan Gamble and Michael Wenyon, is a critical step in broadening the knowledge and appreciation of the work both in terms of the general public and the art world. Rather than approach this work as a complete break with what had come before, it is more accurate to acknowledge its connections to the past and see it as a new, distinct but evolutionary direction for the future.

CREATIVITY AND COMPUTATION. TRACING ATTITUDES AND MOTIVES.

PETER BEYLS

Head, Electronic Imaging Department, St. Lukas School of the Arts

Address: Paleizenstraat 70, B-1210 Brussels, Belgium

Email: peter@arti.vub.ac.be

Is there potential to emulate true creative thinking in a computer program, or are we limited to building machines that merely simulate human creative activity?

The study of the evolution of individual attitudes, personal motivation and critical interpretation of machine-based art brings us to the heart of the matter: how to build synthetic systems that exhibit aspects of true creativity. All this seems hard to expect from a machine. Yet, by studying the architecture of creative algorithms from an artificial intelligence point of view, and by analyzing both knowledge-based, interactive systems and behavior-inspired, creative autonomy in a cross-disciplinary approach, we may begin to shed some light on this complex and perplexing topic.

ART IN THE SOLAR AGE: the sol*art* global network 1995

JÜRGEN CLAUS

Professor, Academy of Media Arts, Cologne, Germany

Address: Centre Overoth, Overoth 5, B-4837 Baelen, Belgium

Telephone: (32) 87 - 74 37 91 + 92; Fax: (32) 87 - 74 37 96

Adoration, celebration and practical use of the Sun was at the very center of many, nearly all, ancient civilizations. The quest for a Solar Age today is defined by changing ecological consciousness and the strong demand of the underprivileged three quarters of the world to participate in a higher quality of living. This quest cannot be based on traditional, non-renewable energies; we must turn to Solar Energy.

If the change toward a Solar Age is to stabilize our civilization, it must involve cultural change. Ecological stability relies on cultural change to be seriously anchored within the different societies of our Planet.

Art is part of the continuous critical, as well as creative, reflection of our life within the Biosphere. The Biosphere concept regards living matter in its entirety as the domain for the accumulation and transformation of the Sun's energy. Is art able to share this concept of all living matter?

The aim of *The Solart Global Network* 1995 is to bring artists together in working with outdoor solar artworks. These might be outdoor holograms, light works depending on direct use of solar power or reflection of Sun light. Highlights of this Solar Festival will be positioned on different parts of the Planet in July and August 1995.

The Solart Global Network 1995 is value-oriented. Network, in this context, means a networking of people who share the same vision of the Solar Age. Technology is used at the most advanced level but only to strengthen the underlying values of a critical and creative redefinition of art in the Biosphere.

THE IMPLICATE BEAUTY OF THE ALGORITHM

BRIAN EVANS

Vanderbilt University U.S.A.

Email: evans@ctrvax.vanderbilt.edu

In its pure form mathematics is often practiced with inquiry as its motivation and aesthetic discovery as its goal. Defining aesthetic experience is difficult. I consider an aesthetic experience a heightened moment when one finds resonance with the perceived, transcending sensation and emotion, and for some, moving towards the spiritual.

An aesthetic moment is not dependent on sensory information. It is cognitive, the mind interacting with perception. Cognition and perception are concerned with ideas, not external objects. Even as basic an experience as color is not dependent on sensory input. Anyone who dreams in color can attest to this. The experience is directly with thoughts, with ideas.

With the advent of technology it is possible to manifest mathematical objects as images, sounds, sculpture and even poetry. Artists in all media have found mathematics (most often described algorithmically) of value in their creative enterprise. Through algorithmic works we discover an inherent beauty and meaning in mathematics, perceived by the senses through objects defined in space or time, for example numbers mapped into color or pitch. Often the source of these works, the mathematical proof, the algorithm, has a beauty (elegance in mathematical parlance) that itself has aesthetic worth. Mathematical ideas can not only be a source for aesthetic construction, but can themselves catalyze aesthetic experience.

Ideas do not need representation in the external, physical world in order to be known. This premise is fundamental to creative activity. Mathematical ideas continue to contribute greatly to the creative endeavors of our civilization. Masterworks of this mathematic enterprise have survived through millennia not only as tools for science but as resonant ideas of aesthetic substance.

AESTHETICS OF A VIRTUAL WORLD

CAROL GIGLIOTTI, Ph.D

Education and Technology Liaison, The Wexner Center for the Arts, Ohio State University
Address: 340 Hopkins Hall, Ohio State University, Columbus, OH 43210 U.S.A.
Telephone: (614) 292-7183; Email: carol@cgrg.ohio-state.edu

The aesthetics of interactive technologies, such as virtual reality, multimedia and telecommunications, inherently involve tough choices for artists and commitment to accepting responsibility for their impact. These choices entail the ability to resist accepting the dehumanizing metaphors already in place. Instead, evolvement of the aesthetics of interaction in these intermedia should recognize and challenge these metaphors.

In making aesthetic choices artists have assumed certain ideas about the purposes and values of art making. Those assumptions have changed over time and have come from various sources both internal and external to the art making process, but they have had primary impact on what was communicated by the art and about the art of any particular time.

With the emerging aesthetic of interactivity, artists face once more the need to recognize and reassess the integral connections between aesthetics and ethics. Various theories of dramatic interaction, such as Bertoldt Brecht's as well as contemporary moral theories which encourage the development of an ethic of care and responsibility for others, may prove helpful. Connections between aesthetics and ethics have had, and will continue to have, great impact on how technology defines and is defined by culture.

ART IN THE AGE OF UBIQUITOUS COMPUTING

RICH GOLD

Composer, cartoonist, artist; Researcher, Xerox Corporation, Palo Alto Research Center; Director of the PARC Artist in Residence Program (PAIR)
Address: Xerox Corporation, 3333 Coyote Hill Road, Palo Alto, CA 94304 U.S.A.
Telephone: (415) 812-4825; Fax: (415) 812-4471; Email: richgold@parc.xerox.com

We are moving into a new technical age called "Ubiquitous Computing" in which there will be computers, sensors and actuators embedded everywhere and invisibly throughout the environment. The big bulky thing with glowing screen and the hundreds of buttons that sits clumsily on your desk, currently called a computer, will disappear. Instead, your desk, chair, door, pad of paper, house, car, white board, clarinet, crayons, refrigerator and tennis shoe will all be computers, and just as importantly, they will all be talking with each other.

This highly sensuous, reactive and gossipy environment will certainly alter the way in which we work, play and think, and it will have an equally profound effect on the arts. Firstly, "Ubi-Comp" will give artists a new palette of techniques and materials with which to create works. Artists of any culture make their art from the "mud of their own riverbank" and we expect artists of the near future to be no different. Secondly, Ubi-Comp will provide the viewer with new ways of seeing and hearing these works, as well as interacting with them. And thirdly, Ubi-Comp will open a new area of artistic exploration, "Enspirited Reality," in which artists can determine the poetics of new objects based on the affordances and histories of each object. A coffee mug might scroll different stories around its surface depending on your preferences, time of day, who else is in the room and the current musings of your favorite author. Your critique could instantly bounce to other breakfast tables about the world. The author explores these and related issues of "Externalized Consciousness," using examples such as the Ubi-Pipe and the Ubi-Lunch-box.

TECHNOLOGY, ABSTRACTION AND KINETIC PAINTING

SAMIA A. HALABY

Unaffiliated artist; Work is included in many museum collections including the Guggenheim Museum in New York and the Chicago Art Institute Gallery. Video of computer work is in the video Library of the Museum of Modern Art in New York.
Address: 103 Franklin Street, New York, NY 10013 U.S.A.
Telephone: (212) 966-3517

New technologies bring new methods to abstract painting. Electronic methods intersect with visual form resulting in a renewal of content, appreciation and criticism. This expands the audience for art as it expands artistic productivity.

Computing provokes three methods in the author's painterly explorations:

1 Programming kinetic paintings with sound, in essence programs performed on a computer, provokes new concepts of the picture plane as monitor and about the sequencing in time of abstract elements. Furthermore, it leads us to "look at" forms not only for their visual attributes but also for their audible ones.

2 Painting software is combined with video to record painting sessions. Watching work from a long painting session compressed onto a video can teach the artist more than years of oil painting and criticism. This is accompanied by an artistic freedom because the expense and difficulty of mixing paints is removed.

3 Using interactive programming to automate the making of kinetic abstraction has provoked the analysis of how artists use nature and reality as a source from which to extract general principles that they use in art. Colors, atmospheres, textures, types of shapes, methods of addition or subtraction of shape, sequencing and rhythm, divisions of the picture's surface — all can be menu-driven to create pictorial art which does not require manual drawing skills.

CONFIGURING HOSPITABLE SPACE

CRAIG HARRIS

Artist
Address: 686 47th Avenue, San Francisco, CA 94121 U.S.A.
Telephone: (415) 750-0684; Email: craig@well.sf.ca.us

The Configurable Space project, a research project based on simulations of future artists' work environments, explores the creative process, and examines the tools and processes that form the foundation for technological resources designed to support creative activities. It is directed towards the development of a balanced understanding about how we use the visual, aural, tactile and configurable capabilities of digital technologies, and how the tools developed affect ways that we think, feel, formulate and develop on intellectual, spiritual and emotional planes.

Configurable Space environments incorporate any available technology that can be used to support the illusion that the implied resources already exist. The simulations incorporate representations of interactive computer display tables, walls and holographic images, within a multi-dimensional sound environment. This creates the context for exploring relevant issues and for imagining how the space might be used in actual circumstances. The author provides a retrospective look at this project.

DETERMINISTIC CHAOS, ITERATIVE MODELS, DYNAMICAL SYSTEMS AND THEIR APPLICATION IN ALGORITHMIC COMPOSITION

MARTIN HERMAN, Ph.D.

Composer; Educator, California State University at Long Beach
Address: Department of Music, California State University at Long Beach, 1250 Bellflower Boulevard, Long Beach, Ca 90808 U.S.A.
Telephone: (310) 985-5691; FAX: (310) 985-2490; Email: mherman@csulb.edu

There has been a growing interest in and an increasingly wide application of dynamical mathematical models in the domain of electronic music composition and synthesis. Iterative models and mathematical chaos algorithms provide for fertile creative ground among composers and researchers.

Employing his research on algorithmic composition involving the application of statistical methods that utilize "chaos" equations, the author has developed programs which use iterative models, non-linear mathematical feedback loops, to generate musical material. The programs have been implemented in MAX, an object-oriented graphic programming environment for computer music composition, on a Macintosh computer. With MAX the author can foray into the area of computer assisted, algorithmic composition; however, the composer's ear and musical judgement are not diminished in importance insofar as the final piece is concerned. To address this issue of human/machine interaction and its implications for computer assisted composition, the author displays the computer models with which one may interact in real time and which generate musical output in MIDI-based systems and plays examples from pieces which have developed from these models.

abstracts
papers
panels

A USER'S GUIDE TO THE ELECTRONIC CLICHÉ

DELLE MAXWELL and ANNETTE WEINTRAUB

Contact: Annette Weintraub, Professor, City College of New York
Address: Department of Art, City College of New York, 138th Street and Convent Avenue, New York, NY 10031 U.S.A.
Telephone: (212) 650-7410; Fax: (212) 650-7438; Email: anwcc@cunyvm.cuny.edu

Are you enticed by the infinite possibilities for image transformation using radically new tools? Do you describe your work in terms of pixel count or computer and software brand names? Is passive experience with outdated art forms no longer relevant to your work? Do you believe that by programming in pattern, meaning will necessarily follow? Do you think that anyone who agrees with George Bernard Shaw's statement that "Symmetry is the enemy of art" has clearly never appreciated the fine points of computer programming? Do you believe that Chaos theory combined with the powers of digital computers can explain everything from the movement of sub-atomic particles to the organization of human consciousness with pretty pictures to prove it? Have you tired yet of reading snide critical reviews about how the digital revolution is being led by art novices ignorant of the lessons of art history?

The critical language of electronic art and its emerging visual conventions have been distorted and debased by superficial visual formulas, visual and verbal clichés and formulaic representations. Many of these representations have become the signature of electronic media, aided by appropriation by commerical interests and wide dissemination through mass media. This has obscured and colored discourse on content and aesthetics in technological art, especially within the mainstream art world.

The authors provide an irreverent examination of the emerging language of the electronic cliché in forms from 2-D to telepresence, and with reference to cultural influences of sexuality and gender, science and politics.

CELLULAR AUTOMATA MUSIC COMPOSITION: a bio-logical inspiration

EDUARDO RECK MIRANDA

Composer, electronic music expert, artificial intelligence and music researcher
Address: AI/Music Group, Faculty of Music & Department of AI, University of Edinburgh, Scotland, UK
Email: miranda@music.ed.ac.uk

Music has always been an interesting domain for the application of new scientific discoveries inviting composers to combine artistic creativity with scientific methods. Today it is becoming increasingly common for the composer to turn to the sciences to supplement his or her compositional model. On the other hand scientists also seem to show interest in the organizational principles found in music.

The motivation in promoting interdisciplinary activities between composers and scientists is twofold. On the one hand it is believed that scientific models carry an important component of human thought, namely formal abstraction, which can be very inspiring for music composition. On the other hand questions are raised such as: "What can be the justification for using science as a compositional tool?," or, "Which aspects of science are applicable to music and how it can be done?" Obviously there are no simple answers for these. Each artist should be able to make her or his own judgements. As far as these questions are concerned, the work introduced by the author is to be regarded only as a contribution for empirical experimentation.

The author has selected a class of mathematical models known as "cellular automata" (CA) to play the central role in this research due to the fact that they have been used to model a wide range of scientific phenomena. During the past three decades scientists have been investigating and developing CA. Although very simple they can provide models for a wide variety of complex phenomena in physics (eg. dynamic and chaotic systems), biology (eg. genetics) and chemistry (eg. chemical reactions and crystal growth).

The author introduces an experimental system for cellular automata music composition called CAMUS (for Cellular Automata MUSic).

INTERACTIVE ARCHITECTURE

CHRISTIAN MÖLLER

Address: Lersnerstrasse 13, 6000 Frankfurt/Main 1, Germany
Telephone: 069/59 43 75; Fax: 069/59 43 75

Through "Interaktive Architecktur" the tactile becomes visible, the visible becomes audible, and the audible may become visible. The artist, playing with these phenomena, invites us to "hear" the shifting light or "see" environmental sounds. Installations such as the *Sound of Growing Grass* and *Surfaces of Variable Visibility* suggest the interesting range of interactive architectures available to artists through the use of electronics.

FORMAL LOGIC AND SELF EXPRESSION

F. KENTON MUSGRAVE

Address: 44015 Falmouth Court, Ashburn, VA 22011
Telephone: (703) 729-5400; Email: musgrave@seas.gwu.edu

The thesis: self-expression in representational imagery may be obtained strictly through the access provided by the formal logic, and accomplishing this represents an event of significance to the history of the creative process. The formal logic is that of computer programs and scientific models of nature, couched as they are in mathematics. The artistic self-expression takes the form of renderings in which the artist is satisfied that an internal archetypal image has been reified, thereby providing a window into his/her soul. Using logic, math and science so directly in the inherently subjective practice of obtaining self-expression marks a peculiar and novel artistic process, one that entrains with it the formidable conceptual depth of those objective disciplines.

In this method, process and medium are neatly partitioned: "process" is the highly abstract task of formulating an appropriate formal system and deriving a suitable theorem in it, while"medium" concerns the physical manifestation of the visual interpretation of the theorem. The formal system consists of "rules of production" in the form of a mathematical model of Nature mapped into a computer program, and "axioms" — the input to that program. Using these instructions, the computer deterministically derives a theorem, which is an abstract "metarepresentation" of an image. The theorem consists of a large string of symbols. These symbols are interpreted as numbers; the numbers are in turn interpreted as colors; the series of point-values for colors as an image; the image as a representation of a possible aspect of Nature; and that rendering of Nature as a spiritual statement by the artist/scientist/mathematician/programmer.

The method is abstruse. The author attempts to describe various aspects of it and to illuminate some of the deep conceptual foundations involved, to the end of supporting the claim that its inception represents a significant event in the history of the creative process. The direct linkage of determinism, contraindicating free will as it does, with spirituality, at least provides an interesting philosophical juxtaposition.

INTERACTIVE JOURNEYS: making room to move in the cultural territories of interactivity

NORIE NEUMARK

Address: 2/15 Baden Street, Coogee, Sydney 2034, Australia
Telephone: Australian Broadcasting Corporation (612) 333-1500

What happens when a theorist and radio/sound artist and a visual artist journey into the terrain of popular cultural and information interactives? The author examines these journeys in order to map a ground for criticism of interactives located at the crossroads of art, science and education practices and paradigms. It excavates cultural meanings underlying the dominant aesthetics in these interactives and asks what they do for their producers and users. Do the metallic bodies armour the user/producer for the fear(delight) of a machine world, producing the very fear (delight) in the process? Is morphing a body technique to evade(explore) the identity crisis precipitated by awareness of cultural difference? What desires produce and are produced by the gravity-less perspective and movement of 3-D animation? Are there tough chrome boy pixels and fluffy pretty girl pixels, marching in the repetitive parade of interactive bodies? And, "are all the pixels white"? Can art be available to new bodies/subjects and new bodies/subjects available to art through images resonating with cultural and aesthetic diversity?

The author explores both the challenges of the "art factor" for popular interactives and the possibilities to engage visual pleasures rather than bypass the sense/s and plug the "brain" directly into data bases or texts. Can we interact differently with young people whose diverse aesthetics, pleasures, consciousness and bodies have been colonized, metallized, normalized by a deadening repetition of dominant computer images and practices? The author's ongoing project with artist Maria Miranda is to create a "real" world familiar/strange enough to excite curiosity, pleasure and engagement by: painting a lush, non-"realist" world (neither predictably hard-edge sci-fi nor soft-edge fantasy), inhabited by culturally diverse bodies; animating a "real" world (domestic and exterior) expressively and fancifully; and infiltrating a popular cultural world with the critical, "inconsistent" edge of the "art factor."

SCIENTISTS DOING ART, ARTISTS DOING SCIENCE

TRUDY MYRRH REAGAN

Founder, YLEM: Artists Using Science and Technology
Address: 967 Moreno, Palo Alto, CA 94303 U.S.A.
Telephone: (415) 856-9593; Email: trudymyrrh@aol.com

Standing on that imaginary ridgetop where the fields of art lie on one hand and those of science and mathematics on the other, the observer first notices the number of scientists, mathematicians and computer scientists who cross the ridge and make contributions in the field of art.

These adventurers include both 20th century art pioneers who began in science-related fields before the age of electronic arts, and those who are using electronic means to bring their science-related expertise into the realm of fine arts. We are particularly indebted to Frank Malina, space scientist and artist, who gave voice to those whose work involves both art and science by starting the journal, *Leonardo,* in 1968.

But the traffic over the ridge is not one-way. The observer is struck as well by the number of artists who, in the course of their work, have been drawn over the ridge into the technical realm. They make contributions in both art and science using electronic tools; they do science with an artist's mind.

It is time to pay tribute to the scientists and artists whose careers have taken them to both sides of the ridgetop. These are towering figures who deserve explicit recognition.

URBAN SITES INFORM SCULPTURAL LIGHT WORKS

LENI SCHWENDINGER

Artist; Faculty, Parsons School of Design
Address: Light Projects Ltd., 448 West 37th Street, Loft 8g, New York, NY 10018 U.S.A.
Telephone: (212) 947-6282; Fax: (212) 947-6289

Leni Schwindinger's site-specific artwork with light, computers and industrial materials are temporal performances and permanent installations in the urban environment. As seen in two of her works, *Deep Time/Deep Space, A Subterranean Journey* (New Denver Airport 12/93) and *The Urban Heart, A Homebody?* (Tokyo 5/93), she addresses issues regarding content and subject matter in relation to site and technology. The work is interdisciplinary, drawing on cinema, music, theatre and architecture. "Interactivity" is redefined as the physical/intellectual engagement of the viewer.

Deep Time/Deep Space, A Subterranean Journey was commissioned by the City of Denver. This light and sculpture environment is installed in a mile-long shuttle-train tunnel. Arriving travelers perceive sculptural forms "animated" by the moving train. Materials include steel, reflective materials and lighting. Images informed by construction, mining, aerospace and subterranean fantasy worlds surround the train and segue into each other.

The Urban Heart, A Homebody? was performed in Tokyo using a biomorphically shaped concrete house as a canvas. The projection montage explored ideas about home, from the body as home to the heart, to the city as the intricate and pulsing center of contemporary life. Giant shadows cast by audience members were interwoven with projected paintings inspired by the human heart and symbols of Tokyo. Artist and audience created an ever changing visual landscape as the interaction of human figures revealed previously hidden images.

THE SEMIOTICS OF THE DIGITAL IMAGE

PATRICIA SEARCH

Artist/Assistant Professor
Addres: Rensselaer Polytechnic Institute, Troy, New York 12180-3590 U.S.A.
Telephone: (518) 276-6470; Fax: (581) 276-4092; Email: searcp@rpi.edu

Current critical strategies such as Western formalism and postmodernist theory fail to provide an adequate framework for interpreting many forms of "digital" art. The author presents a perspective that differs from many other contemporary writings on the aesthetics of computer graphics — writings that highlight characteristics of the digital medium such as kinetics, interaction and networking, simulation and numerical analysis as evaluative criteria for defining the aesthetics of computer art. Using artwork from the 1950's to the present, it is shown how the semiotic structure of the digital image defines a new visual aesthetic in which symbols become interpretations of symbols and multiple levels of graphic encoding take on discursive characteristics similar to linguistic syntax. As this conceptual environment of symbols and text replaces tactile and kinesthetic interaction with the artwork, new forms of creative expression codify form, space, action and time into diverse levels of abstraction. The author examines the semiotics of the digital image within the context of philosophical developments in mathematics and science where causality and deterministic logic have been replaced by "descriptive" mathematics and scientific theories of relativity and quantum physics. These scientific methods place an emphasis on process and the relationships between cognitive and perceptual patterns that evolve from those processes — themes that are embedded in many forms of digital art.

LIVE INTERACTION APPLICATIONS FOR REAL-TIME FFT-BASED RESYNTHESIS

ZACK SETTEL and CORT LIPPE

Address: IRCAM, 31 rue St-Merri, Paris, 75004, France
Telephone: (33-1) 44.78.48.84; Fax: (33-1) 42.77.29.47
Email: settel@ircam.fr; or lippe@ircam.fr

The Fast Fourier Transform (FFT) is a powerful general purpose algorithm widely used in signal analysis. The FFT can be combined with the Inverse Fast Fourier Transform (IFFT) in order to resynthesize signals based on their analysis. This application of the FFT/IFFT is of particular interest in electroacoustic music because it allows for a high degree of control of a given signal's spectral information (timbre) allowing for flexible and efficient implementation of signal processing algorithms.

The authors present real-time musical applications using the IRCAM Signal Processing Workstation (ISPW) [Lindemann, et al, 1989] which make use of FFT-based resynthesis for timbral transformation in a compositional context. A user interface, developed by the authors in the MAX programming environment [Puckette, 1988], is used to demonstrate the subject. Examples include vocoders, cross-synthesis, dynamic spectrum shaping, frequency-domain spatialization. The focus is on these transformations and their control structures in terms of fine timbral control from a composer's point of view.

CREATIVE PROBLEM SOLVING AS AESTHETIC EXPERIENCE

GEORGE K. SHORTESS

Artist; Psychologist, Lehigh University
Address: Department of Psychology, 17 Memorial Drive East, Lehigh University, Bethlehem, PA 18015, U.S.A.
FAX: (215) 974-6467; Email: gks0@lehigh.edu

We can better appreciate computer-based interactive art by applying the results of theoretical and empirical studies of creative problem solving. This is illustrated by looking at examples of the author's interactive art works, which are themselves artistic and conceptual statements of perception and cognition.

While all art involves an interaction of the viewer with an object or an event, interactive art makes explicit this idea and requires the viewers to become behaviorally involved with the work. This is in contrast to the more detached contemplation often associated with the aesthetic experience. In the author's work, movements by the viewer activate photocells or other sensors which then, through a computer interface, change the sound or visual environment for the viewer. The environment is the art object, while the set of elements involved in the interaction is the art work.

In this context the viewer exercises creativity and problem solving, which become part of the art work itself. We can understand these psychological processes within the context of the theories of problem solving and creativity, using the author's work to illustrate. It is necessary to expand our understanding of the aesthetic experience to include problem solving behavior. And, electronic media have a special role to play in this expansion of the meaning of art.

QUALITATIVE, DIALECTICAL AND EXPERIENTIAL DOMAINS OF ELECTRONIC ART

REJANE SPITZ

Artist, researcher; Professor, Pontificia Universidade Catolica-RJ/Departamento de Artes
Address: Rua Marques de Sao Vicente 225 - Rio de Janeiro - CEP 22453 Brazil
Telephone: (55-21) 529-9211; Fax: (55-21) 259-1893; Email: rejane@inf.puc-rio.br

The objective, quantitative and procedural characteristics of computer related languages contrast sharply with the expressive potential of human natural languages, which extend over aesthetic, metaphoric, artistic, affective and moral domains. Why can't these various dimensions co-exist, asks Streibel (1986)?

For a long time, artists' and technologists' views seemed worlds apart. In the words of Gregory (1980), "scientists fight error, while artists court illusion." The dilemma is not a new one. On the conflict between artistic and scientific approaches, Plato wrote, in his *Republic*: "the part of the soul that opines in contradiction of measurement could not be the same with that which confirms it."

Electronic Art is showing, however, that these complementary approaches can be combined: artists and technologists may blend their different perceptions and knowledge in order to enable the construction of a qualitative, dialectical and experiential electronic expressive language. In a world of social, cultural and economic disparities, maintaining a balance between uniqueness and uniformity needs to be the contemporary electronic artist's major struggle.

THE ELECTRONIC GARDEN

IAIN WHITECROSS

Artist
Address: 463 West Street, Apt. 623, New York, NY 10014 U.S.A.
Telephone: (212) 219-1097 Fax: (212) 989-1395

The Electronic Garden is a cybernetic sculptural environment created by the author and exhibited at the Hyde Collection in Glens Fall, New York in the winter of 1992-93. It is composed of nine freestanding "plants," each consisting of a cluster of "flowers" with the tallest being about human height. The *Garden* is activated by sound and spectators are encouraged to clap, sing, talk or even play a musical instrument.

The roots of this garden go back to the author's early contacts with Experiments in Art and Technology (EAT) in New York City, and his subsequent collaboration with an engineer, stimulating his interest in merging art and technology. Sociopolitical and artistic influences include the work of such historic figures as Hieronymus Bosch, Leonardo da Vinci, Claude Monet and Georgia O'Keefe. The philosophical significance of *The Electronic Garden* owes much to the writings of Arthur Koestler, Norbert Weiner and Carl von Linnaeus.

The *Garden* began as part of a youthful dream to employ technology for peaceful purposes. Over the years it has gained additional meanings. The *Garden* is a fragile image of the natural world in the cybernetic age, a natural world that we now know is also very fragile. In this sense, the *Garden* is a faint reminder of what we stand to lose unless we listen far more carefully to nature's feedback and improve our present wayward stewardship. But feedback alone — empirical and scientific— is not enough. We must also be aware of "feedforward" [Dudley Young] — intuitive and magical. The *Garden* is also, as are all gardens, a place where spirits come and go, where magic strikes and contact with the mythic is possible.

LIGHT AND DARK VISIONS: the relationship of cultural theory to art that uses emerging technologies

STEPHEN WILSON

Artist; Professor, San Francisco State University
Address: Art Department, San Francisco State University, San Francisco, CA 94132 U.S.A.
Telephone: (415) 338-2291; (415) 338-6537; Email: swilson@sfsuvax1.sfsu.edu

The impact of technology on contemporary life and culture is a vital issue in our age. Critical theory and cultural studies attempt to link the arts, literature, politics, sociology, anthropology, philosophy and technology in an interdisciplinary search for relevant concepts and frameworks with which to understand the current world. Art practice and theory are being radically reshaped by this activity.

This hybrid world of culture/art criticism, which places great import on the impact of emerging technologies, has seemed unexpectedly uninterested in the work of artists who work with these very technologies. Similarly, the discourse in the art/technology world — and in the technical world in general — has not engaged deeply the concepts from cultural studies. What reasons underlie this mutual lack of attention?

Critical theory and cultural studies offer compelling tools for understanding some aspects of contemporary technological society. However, while useful for understanding what exists, they are problematic for envisioning what might be. In this sense, they pose significant challenges for the artist. How should artists conceptualize their work? What sense can they make of the art world and its relationship to the larger culture? There are competing visions of how artists can most fruitfully work with emerging technologies: treat them as new media, deconstruct their cultural implications or participate in the process of invention and extension. Artists who work with emerging technologies are faced with the challenge of positioning themselves in these conflicting world views.

ART IMAGING WITH COLOR COPIERS: a survey of artworks from north america and europe

MARY STIEGLITZ WITTE, PhD.

Professor of Art, Boise State University
Address: Boise State University, 1910 University Drive, Boise, ID 83725 U.S.A.
Telephone: (208) 385-1053; Email: mwitte@claven.idbsu.edu

Artists began experimenting with photocopiers when the first commercial plain paper copier was introduced by Xerox in 1959. Interest increased with the availability of full color copiers. The early 1970's saw artists working on the 3M Color-in-Color System I and II, and the Color Xerox 6500. Early color copiers offered capabilities for creative printing, some manipulation of images and colors, and the transfer of images to other surfaces. They became a new tool for artists, photographers and designers. They provided direct, spontaneous image making with potential for new transformations. As color copier technology advanced, appropriation and artifice became issues.

The increased powers of the 1990's generation of color copiers provide opportunity for new directions in imaging. The switch from light-lens to digital laser scanning extended capabilities. Digital technology offers increased control, versatility and resolution. Laser scanners "read" the image, capture the image digit-by-digit and process the information by computer. The distinction between digital and analog representation is important. Digital information is easy to manipulate, recombine and transform. Appropriation is effortless. These copiers accept color negative or positive transparencies, prints or actual objects on the glass using the copier as a "camera." Some color copiers also interface with computer, video and CD-ROM imagery.

Artists approach color copiers with diversity, spontaneity, a sense of discovery, exploitation of the technology and elements of play. The opportunity for artist/machine interaction affords the potential for new combines of art and technology, and a fresh repertory of forms, methods, communications and interpretations.

THE COMPUTER AS A TOOL FOR SCULPTORS: sculpting in cyberspace

Rob Fisher, chair
288 North Allegheny Street, Bellefonte, PA 16823 U.S.A. Telephone: (814) 355-1458
Stewart Dickson
1105 Burtonwood Avenue, Thousand Oaks, CA 91360 U.S.A. Telephone: (213) 462-2300 ext.832
Timothy Duffield
1551 Johnny's Way, West Chester, PA 19382 U.S.A. Telephone: (215) 430-8557
Helaman Ferguson
10512 Pilla Terra Court, Laurel, MD 20723-5728 U.S.A. Telephone: (301) 776-0499
Bruce Hamilton
Route 1, Box 5-c, Glorieta, NM 87535-9701 U.S.A. Telephone: (505) 757-6603
Frank McGuire
1472 South Boulevard, Kent OH 44240 U.S.A. Telephone: (216) 678-6313
David Morris
35 York Street, Brooklyn, NY 11201 U.S.A. Telephone: (718) 797-1747
Steve Pevnick
2602 East Hampshire Street, Milwaukee, WI 53211 U.S.A. Telephone (414) 961-8818

Sculptors today have the opportunity, if they choose, to explore human/machine interaction by employing new technologies in a "traditional" art form. This exploration accommodates a breadth of experience and approach, from Stewart Dickson's sculpture of mathematical surfaces to Timothy Duffield's fantastic landscapes; from Rob Fisher's crystalline spaceframe sculpture to Helaman Ferguson's direct carving celebrating mathematics; from Frank McGuire's sculpture derived from principles of genetic evolution to David Morris' "river crystal" fountains and cascades. In the work of these sculptors, the computer is both tool and inspiration. In the work of these artists, the boundaries between disciplines begin to dissolve.

COPING WITH HYPERCULTURE: technological change and the pace of cultural adaptation

Simon Penny, chair
Carnegie Mellon University, Fine Arts Department, 5000 Forbes Avenue, Pittsburgh, PA 15213 U.S.A. Telephone: (412) 268-2409
Peter Lunenfeld
1027 N. Orlando Avenue, Los Angeles, CA 90069 U.S.A. Telephone: (213) 650-6480
Lev Manovich
Department of Visual Arts, UMBC, Baltimore, MD 21228 U.S.A. Telephone: (410) 455-2150
Email: manovich@gl.umbc.edu
Jeffrey Schultz
3521 Hoyt Street, Brooklyn, NY 11231 U.S.A. Email jeffschlz@aol.com

Accepting the premise that technology is a "black box," that any technological tool has no meaning until it is placed within a cultural system, there must exist cultural mechanisms by which new technologies are "naturalized" into culture. The exponentially accelerating speed of technological change leads us to question whether there is a maximum speed of cultural adaptation. Consider the paroxysms of confusion that copyright law is in due to the presence of new technologies. The mechanisms of cultural adaptation are slipping behind.

Despite the apocalyptic overtones, this is a very practical problem for artists in electronic media. Over the last twenty years we have seen short eras of technological art practice become technologically obsolete and slip from historical view. Thus artists, forced to upgrade technology continually, are caught in a cycle of unrequited technological consumption. In addition, the pace of technological change prevents a holistic consideration of the cultural context of the subject matter by the artist. And, the largely unacknowledged burden of artists who choose to explore new media is that they often find themselves in the R+D function of designing the technology, rather than simply aesthetically manipulating a traditonal art technology.

Audiences as well as artists are affected by the rate of technological change. The codes and conventions required to "read the work" have not been culturally established. The unacknowledged burden on viewers of electronic work is that they must take care not to impose critical judgments germane to an older discipline (such as painting) upon a different technology. How do we cope?

THE NETWORK WITHOUT WALLS: the re-definition of art in an age of telecommunications

Greg Garvey, chair
1455 De Maisonneuve Blvd. West, Montreal, Quebec Canada H3G IM8 Telephone: (514) 848-4629
Roy Ascott
64 Upper Cheltenham Place, Bristol, U.K. B56 5HR Telephone: 0272-550151
Brenda Laurel
Interval Research, 1801 Page Mill Road, Building C, Palo Alto, CA 94304 U.S.A.
Telephone: (415) 354-0882
Carl Eugene Loeffler
Carnegie Mellon University, 5000 Forbes Avenue, Pittsburgh, PA 15213 U.S.A.
Telephone: (412) 268-2409

Over the last twenty years artists have been colonizing a range of technologies for the creation, dissemination and distribution of artwork in parallel to, and in spite of, the traditional means of exposure through the museum/gallery system. Telecommunication Art events represent a fundamental paradigm shift by redefining how artwork is created and shared, shoving aside the geography of territorial imperatives of art centers, overthrowing traditions of criticism, redefining the notion of avant-gardism, ignoring curatorial politics of exclusion, subverting the commodity status and questioning the mythology of the unique work of art. Today's artist with access to a computer and modem, fax or picture-phone can be part of the connectivity of the Virtual Global Village group show regardless of race, creed, color, sex, geographical location or time zone.

THE ART FACTOR: INTERNATIONAL EXHIBITION OF ELECTRONIC ART
october 29 to december 16, 1993

More than a year ago, planners for FISEA 93 aptly chose *The Art Factor* as the theme for this symposium. It is an appropriate theme because, for the first time, this event is being hosted by an art college – a place where new art forms are being discussed and can emerge. Moreover, it is appropriate because it is my belief that now is the time to emphasize the artistic over the technological aspect of this relatively young art form. Only if practitioners of electronic art have an understanding of both the history of art and contemporary aesthetics – with all its richness and diversity – will their art achieve its greatest potential as being the leading art form in the next century.

The Art Factor: International Exhibition of Electronic Art surveys the broad range of applications in electronic art today. While far from conclusive — large-scale installations and environmental pieces could not be included, for example — this exhibition establishes a solid foundation for the viewer. Like the technology in which it is based, computer generated art is sure to grow rapidly. Modern art has had a love/hate relationship with technology, at one moment embracing it as a panacea and the next rejecting it as a cause for all that is wrong in society. Nevertheless, the computer and its related technologies will take their place among the fundamental tools for making art.

More than 120 applications were received for this exhibition with 46 artists finally invited to participate. I'd like to thank the jurors Jim Dozier, independent curator and Judith Yourman, visual artist and Assistant Professor of Electronic Media, St. Olaf College, for their hard work in selecting this outstanding group of participants. Additional thanks go to Lisa Daehlin, gallery assistant; Anastasia Faunce, public relations; Bradford Smith, media center; Lars Mason, building services; and to the exhibition crew. Finally, I am grateful to the artists themselves for their cooperation and good humor throughout the entire process. My deepest gratitude goes to Roman Verostko for inviting me to participate in this project. It has been a rewarding experience indeed.

Brian Szott, chair, exhibition

Brian Szott is director of MCAD Gallery at the Minneapolis College of Art and Design. He received his Masters Degree in Museology with an emphasis in twentieth century painting and sculpture from the University of Minnesota, Minneapolis, MN. Exhibitions he has organized include *Picture This! Contemporary Childrens Book Illustrators from Minnesota; Chicagoland: Recent Work by Tom Arndt;* and *The Art Factor: International Exhibition of Electronic Art*. In addition to his duties as gallery director, Szott oversees the College's continuing studies program.

ABE
ACEVEDO
ARNTSON
BADGER
BESSA
BRADLEY
BREIGER
BRILL
CASH
CHMELEWSKI
DALE
DAVIES
DAVISON
DEHLINGER
DICKSON
DIMON
FARBER
FENSTER
FLAX
FRAGA
GEORGE
GLEESON
HOLZER
HUSOM
KAC
KRAUSE
MERRILL
MOSHER
MÜHLECK
MUNZNER
MURPHY
ROSE
SEAMAN
SHAPIRO
SHERMAN
SMITH
SUN
TONKIN
TRAUBE
TREMBLAY
TRUCKENBROD
VICENTE
WALKER
WEINTRAUB
WILSON
ZAHALKA

the art factor exhibition

YOSHIYUKI ABE

Independent artist
Address: 3-20-27 Meguro, Meguro-ku, Tokyo 153, Japan
Fax: +81-3-3793-5953; Email: y.abe@ieee.org

The extended shading system of raytracing provides a look at new aspects of illuminated objects. Using numerous (30 to 500) light sources, I am creating the series, *Light=Shade*, which reveals images of light integration. In the algorithm, lighted regions can be easily transferred to shade and vice versa by parameter manipulation.

The potential of computer as an image generator meets my creative interest in the realization of images we can not see in the actual world.

VICTOR ACEVEDO

Independent artist
Address: 956 1/2 North Vista Street, Los Angeles, CA 90046 U.S.A.
Telephone: (213) 851-7594

Acevedo's work composites his own photography with 3-D computer generated models and digital painting. He utilizes a variety of software running on both the IBM and Macintosh. The final images are output via a film recorder as transparencies or as archival IRIS ink jet prints on Arches watercolor paper.

The computer, as a medium, is for the artist a kind of hybrid of painting and sculpture. Virtual objects can be built and moved as desired in a graphical three-space as well as expressively textured, lit or metamorphosed. The work has been described as a visual memoir of "everyday cymatic precessional resonance," that is to say, there is an intent to make visible the momentary crystallization of "localized psychic energy networks" which exist in non-parallel association with people and their environment. These networks are usually represented by the interweave or overlay of geometric abstraction such as non-cubical polyhedral nets or spherical planar arrays on late 20th century genre scenes.

AMY E. ARNTSON

Artist; Professor, Art Department Chairperson, University of Wisconsin-Whitewater
Address: Center of the Arts, University of Wisconsin-Whitewater, Whitewater, WI 53190 U.S.A.
Telephone: (414) 472-1324

As an artist, educator and communicator I am interested in mixed media, multi-disciplinary investigations using computer, photography and painting techniques. The computer has a non linear nature that can access, assimilate and manipulate visual data, scrambling notions of time and place. Combining old and new techniques with old and new visual images is a way of investigating the links between who we have been and who we are becoming. Nostalgia for a world of firmly fixed values mingles with curiosity and faith in newly emerging forms. *Ode to Yves* (Yves Tanguy) sets a computer manipulated duratrans image as a backlit screen for a surrealistic space. This space is created inside a house/temple structure equipped with fresnel lenses for magnification.

PAUL BADGER

Independent artist
Address: 2626 Deming Road, Columbus, OH 43202 U.S.A.

Badger's lithographs included in the FISEA 93 exhibition are from a series executed in 1993.

ROMEU BESSA

Artist, University of Illinois at Urbana-Champaign
Address: 1914-C Orchard Street, Urbana, IL 61801 U.S.A.
Telephone: (217) 337-0858

I am a painter. Although, since 1987 I have been imagemaking with computers as well. I use the computer as a medium in the same way that as a painter I use my brushes and my oil paints. I am fascinated by the similarities and by the differences between the two media, computer graphics and oil painting. I like to use the mouse knowing that the image on the screen is a "translation" of the movements of my hand. This "translation" is the result of digital codes being processed by a machine. Oil painting, by contrast, is the movement of the brush in my hand carrying the paint on the canvas. The investigation of this ontological difference is at the core of my work.

The visual complexity of my computer images is directly related to my painting. Whereas painting has its origin in the beginning of imagemaking (sometimes in caves), computer images point to a new kind of communication in a new kind of space. As the dark hole of the cave houses the visions of a particular age, so the black box of the computer stores the images of a new time. Cyberspace — a modern cave.

STEVE BRADLEY

Artist; Assistant Professor of Art, Electronic Imaging, College of New Rochelle
Address: 112 Warren Street, New Rochelle, NY 10801 U.S.A.
Telephone: (914) 235-0516, (914) 654-5205; Fax: (914) 654-5290
Email: cnrb%iona.bitnet@cunyvm.cuny.edu

I consider myself to be a trans-media artist or generalist. I convert systems of cultural iconography via media and technology into an analytical and satirical electronic narrative. I have been conditioned by the media culture so television (media) easily serves as my electronic landscape. The computer serves as the primary tool by which I link all my tools including sound, imaging and varied commercial software. By digitizing, manipulating and re-digitizing the electronic images of media, I am illustrating how "propaganda is to democracy what violence is to totalitarianism." Noam Chomsky's admonition to those who attempt to analyze the methods and messages of public control speaks to artists as well as political theorists:

"For those who stubbornly seek freedom, there can be no more urgent task than to come to understand the mechanisms and practices of indoctrination. These are easy to perceive in the totalitarian societies, much less so in the system of 'brain-washing under freedom' to which we are subjected and which all too often we serve as willing or unwitting instruments." (Chomsky, *The Manufacture of Consent*)

My own daily awareness of TV/print propaganda through image and script and what is not written or filmed is translated into art that speaks in the language of mass culture but offers "coverage" and interpretation that is erased or ignored in mainstream TV culture. My job is to share my outrage and sense of absurdity to effect some point of awareness in the vast network of cyberspace and wall space. By "naming" the codes of control, I seek empowerment for myself and therefore my community so we can stay awake in the midst of the media's pervasive anesthesia that numbs us to hear no evil, speak no evil and see no evil.

ELAINE BREIGER

Artist; Instructor, School of Visual Arts, New York City
Address: 112 Greene Street, New York, NY 10012 U.S.A.
Telephone: (212) 966-3004

With the Digital Arts 3-D modeling program, I create an object and then operationally — spinning, stretching, sliding — recreate it to view it in a changing perspective. Additional surface changes with texture maps, along with the almost unlimited palette to color light, allow this provocative, metamorphic process to continue.

Negatives are made to create photo etchings, and these respective images form the metal plates that are prepared for inking — a transfer of projected light to pigment — which culminates in a print made possible by a partnership among technologies.

BOB BRILL

Independent artist
Address: 7 Lois Court, Ann Arbor, MI 48103 U.S.A.

In an essay at the end of Lolita, Vladimir Nabokov writes, "For me a work of fiction exists only insofar as it affords me what I shall bluntly call 'aesthetic bliss.'" That phrase "aesthetic bliss" has stuck in my mind over the years, since it expresses precisely and entirely what matters for me in the visual arts. I am not interested in portraying social, political or moral themes, nor in exploring and expressing my inner psyche, nor in constructing academic exercises in form and color. This is not to deny for others the validity of such expressions. There's room in my world for every type of artist, as there is, alas, for every type of person. As for me, all I care about is beauty. I do not always succeed in invoking it, but my aim is to establish a momentary connection between the viewer's soul and the underlying order of the world. When that occurs it is usually signaled by a sudden intake of breath or a long pleasurable sigh. If you've had that experience, then you know what I mean by aesthetic bliss.

For several years now I have been exploring algorithmic art. For me this means creating images by writing computer programs that embody mathematical formulas or other orderly procedures. My pursuit of beauty has led me along this path, for mathematics, more than any other human activity, seems to offer connections to the cryptic universal order I am striving to express.

SYDNEY CASH

Independent sculptor
Address 72 Reservoir Road, Marlboro, NY 12542 U.S.A.
Telephone: (914) 236-7032

Sydney Cash is a sculptor who has been working with glass as a primary medium for twenty-five years. His sculptures have been shown internationally, he has received fellowship awards from the National Endowment for the Arts and the New York State Foundation for the Arts and his work is found in many private and public collections, including those of The Museum of Modern Art and the Corning Museum of Glass.

Visual Motility was created in 1991 and is constructed from flat glass upon which computer-generated imagery has been silk-screened with epoxy inks.

KATHLEEN CHMELEWSKI

Artist, graphic designer; Assistant Professor, University of Illinois at Urbana-Champaign
Address: 2006 Boudreau Drive, Urbana, IL 61801 U.S.A.
Telephone: (217) 328-4303 or (217) 333-0855; Email: kathleen@ux1.cso.uiuc.edu

In recent years I have grappled with a wide range of health problems and have come very close to death. As with many of my colleagues, photographic chemicals literally became hazardous to my health. Some years ago, I began making digital images, being forced to limit my exposure to photographic chemical processes and many household chemicals as well. I became sensitized to my relationship with the environment as I realized how all-pervasive chemicals are in our culture. I was shocked, dismayed and angry; I was looking for a scapegoat. Since then, I have come to understand that all life forms are interdependent and this old axiom is very true: we reap what we sow.

Self Portrait is part of a larger group of pictures called *Thoughts on Mortality* in which I examine my feelings and understanding of illness, health, death and life. Since death is culturally defined, shaking my fear of it was like trudging through quicksand. In all honesty, fear still lurks in the background when I am feeling vulnerable; but now I recognize the "fear" as frightening, not death. I have finally come to recognize death as an integral part of life.

DENIS A. DALE

Printmaker/Graphic Designer; Assistant Professor of Art/Design at the University of Wisconsin-Whitewater
Address: University of Wisconsin, College of Arts, Whitewater, WI 53190 U.S.A.
Telephone: (414) 472-1324

Our perceptions of ourselves and our world are molded by our experiences and beliefs. These perceptions are based upon our economic and emotional environments, our personal relationships and, in part, the influences of mass media. *Traveling Through Time* to my present state, I have found that lessons learned earlier have an important impact on the way I feel, write and dream. The endless searching and the psychological and physical distances we all travel as we progress through life underscore my work. I use the unique capabilities of the computer to digitally capture, compose and reshape imagery from multiple video sources. Video reference allows me to select the moment, the aura of the time and the attitude of the players. All of the work's moments evolve "together" through my approach of blending and shaping, feeling the way, much like how we process every experience we share as we all "travel through time."

CHAR DAVIES

Artist; Vice-President of Visual Research, SOFTIMAGE Inc.
Address: SOFTIMAGE Inc., 3510 boul. St-Laurent, Suite 500, Montreal, Quebec, Canada H2X 2V2
Telephone: (514) 845-1636; Fax: (514) 845-8755

Drowning (Rapture) is a still-frame of a virtual three-dimensional world, created with the 3-D animation software SOFTIMAGE. It is exhibited as a backlit photographic transparency in order to recall the luminosity of the computer screen and, more importantly, suggest a radiant numinosity of spirit. The image resulted from an experience I had while diving in 6000 feet of blue oceanic space, of temptation to surrender to an entity greater than oneself, an entranced state of being sea-farers called "rapture of the deep."

This image is from an ongoing series that draws inspiration from archetypal aspects of nature and the body in the belief (and hope) that such imagery can re-connect us on a deep level to the living, flowing world. In this light, my research is philosophical as it attempts to compensate for the western worldview which, based on Cartesian dualism, tends to emphasize our separateness from (and mastery of) the world.

3-D computer technology, as progeny of western science, supports visual conventions that tend to reinforce the western worldview. My research necessarily involves developing an alternative aesthetic that subverts these conventions (ie objective realism, linear perspective, Cartesian space) in order to express an alternative holistic vision. Working with simulated light, optics and three-dimensional form in virtual space, I deliberately combine photo-realism with spatial ambiguity, representation with abstraction, dissolving boundaries and collapsing figure-ground, as a means of re-affirming our essential embeddedness in nature, and merging "self" with world.

BILL DAVISON

Independent artist
Address: 179 Main Street, Winooski, VT U.S.A.
Telephone: (802) 655-0407

"This is what hunting really is: a contest of confrontation between two systems of instincts. But for this to occur it is necessary that those instincts...function freely." (Ortega Y. Gasset, *Meditations on Hunting*, 1972)

The computer generated screenprints I make are constructed using successive layers of printed information reflecting five photographic and electronic systems, each with a unique visual syntax. By technical maneuvers which combine elements of chance and logic, these "languages" are caused to vanish, remain as fragments, or because of incidence, form new translations, new marks. (The inventive process in this sequencing format is not unlike the essence of hunting.)

The many varieties of ink applied to the paper surfaces display unusual physical characteristics, and depending on opacity, transparency, viscosity and location, have different functions: to be non-referential masses or to enhance illusionary space. Secondary areas of rayon fibers — a sensuous material with optical qualities — are used as foils to the tradition of "ink saturation" and provide soft, textural nuances.

Image diagrams — realized by the interface of twentieth century visualization tools with tenth century stenciling methods — are concerned with revelations about process, ambient surprise, icons, and most importantly, the pleasure of nostalgia.

HANS DEHLINGER

Professor; Director of the Institute, "Design-Kunst-Computer" at the University of Kassel
Address: Department of Product Design, University of Kassel, Menzelstr. 15, D - 34109 Kassel, Germany
Telephone (home): 0561 / 408-039; Fax: 011-49-561-26055

Throughout history, artists have produced drawings. As an art-form drawings can be both utterly reduced and very sophisticated. Mostly monochromatic and more related to writing than to painting they exhibit a transient element, which is attributed to the movement of the pen-equipped hand. We can think of drawings as a unique and very rich domain of artistic involvement and expression.

It is my hypothesis that there exists an equally rich universe of algorithmically generated drawings. In my work I try in an experimental way to produce such drawings. Such a drawing should exploit algorithmic techniques, be nonreproduceable by hand, show that it has been drawn by a machine, achieve a type of line and structuring belonging to a distinct and unique universe of its own, exhibit strong calligraphic qualities and make the question "how was it done?" entirely unimportant.

The drawings are plotted on paper with ink and ball-point pens. The basic line-element is a polygon. A number of parameters, like length of segment, angle, number of segments, spread and so on, are used to control the development of lines. Lines may be clipped and manipulated in various ways. The program in its present form is written in Fortran using GKS and is operable on a Siemens WS 430 workstation. It was implemented as part of a partnership-project between the University of Kassel (Hans Dehlinger) and the North China University of Technology in Beijing (Qi Dongxu, Xu Yingqing).

STEWART DICKSON

Independent sculptor
Address: The Post Group, 6335 Homewood Avenue, Los Angeles, CA 90028 U.S.A.
Telephone: (213) 462-2300 ext. 832; FAX: (213) 464-1953; Email: tpg!dickson@rhythm.com

Tools extend the range of our senses and our physical selves. The digital computer is a radically novel tool in the history of humankind. Never before have we known such a tool with which we can explore the structure of our understanding of ourselves and our universe.

The computer, as a creative device, is an expressive conduit of our profound internal being. The image is a loaded visual presentation which stirs the senses and touches the emotions and soul of the viewer. A computer-generated stereogram is a projection of computer-represented three-space into the viewer's perceptual three-space. It is an internal link between machine-resident abstraction and the mind of the viewer. I state the image I make to the computer and to other people in concise language, invented by humans to convey abstract concepts.

The terms of computer art consist of nothing less than the immutable absolutes which form the structure of the universe. Inasmuch as we are products and part of our universe, we have the potential to use this extension of ourselves to treat every aspect of our physical and abstract existence. I see this as a source of great social benefit and cultural change. I hope to have the opportunity to make my art a part of this.

ROZ DIMON

Artist
Address: 2 Charlton Street #3L, New York, NY 10014 U.S.A.
Telephone: (212) 645-3608

I have been painting "pixels" (electronic squares) for many years as a way of visually processing the changes wrought by increasingly sophisticated technology. The computer affects every facet of our lives from the kitchen to the operating room to outer space, and there seems to be no end in sight to this digital revolution.

A new visual language is required to portray such a complex and changing world. It is a language of digital hieroglyphics and condensed information. My work is representative of this new language. Many of my pieces are simultaneously serious and funny, painterly and digital, and most contain a complex riddle, much like life itself.

There is a brush-like aesthetic and visual maturity in my digital work. I believe this evolves directly from my many years as a painter, along with the consistent focus of my subject matter: the juxtaposition of life to technology. With the advent of the creative possibilities of the computer, my digital process and subject matter became one. I feel the computer incorporates the ultimate electronic message in the medium itself via the pixel.

LESLIE NOBLER FARBER

Artist; Assistant Professor, William Peterson College
Address: Art Department, William Paterson College, 300 Pompton Road, Wayne, NJ 07470 U.S.A.

The works exhibited, *Confettied Chips* and *Sawtooth*, represent an investigation into dualities, namely machine versus hand, or technology as compared to humankind, and integration versus fragmentation. Systems, networks, linkages, connections, replication — the physical nature of the medium greatly influences this work. These concepts are interpreted in a personal way, often employing elements from the time-honored "feminine" tradition of the patchwork quilt. In exploring the antithetical subjects of connectivity, layering and intermeshing versus separation and detachment, I present each piece within the familiar rectangular frame, while shifting the depth and scale of the visual "data" in a non-traditional fashion. These works bring into play patchworked imagery of microprocessors and hand held tools (technological or not, as in the superimposed saw) as well as work by hand, visible in the painting, dyeing and stitching. Systems and connectivity, or its converse, detachment, are visual metaphors for the personal/interpersonal issues arising in a woman's, mother's, educator's —, i.e. my, life.

DIANE FENSTER

Artist, Science Graphics Center, San Francisco State University
Address: 140 Berendos Avenue, Pacifica, CA 94044 U.S.A.
Telephone: (415) 338-1409; Fax: (415) 338-6136; Email: fenster@sfsuvax1.sfsu.edu

Computer technology has provided me with the opportunity to manipulate, edit and expand the photomontage format that most suits my personal artistic expression. My work reflects my interest in both the Dada and Surrealist art movements, primarily in the use of seemingly unrelated visual elements. This methodology enables me to represent an almost "cinematic" storyline based on the relationship of each of the vignettes within a particular piece. The technology has actually freed my range of expression and allowed an even more personal shaping of the symbolic elements I use in my work.

There is an odd contradiction in my current work in that I am attempting to create "mythic images" which relate both to the collective unconscious and the personal process of individuation while using advanced industrial technology. Here is where the technology excels in providing me with a way of crafting dreamlike sequences that seemingly float into each other, overlap and emerge, reflecting the inner processes I am attempting to portray. The juxtaposition of the image elements hopefully serves as a catalyst for the viewer's recognition of her/his own inner processes of transformation.

My work is a combination of myth, spirit, science and technology. I see myself as a modern alchemist, using silicon chips as a tool to transform electrical patterns into art. The computer does not destroy your soul as I once thought but rather can liberate a creative aspect of the self which might otherwise remain undiscovered.

CAROL FLAX

Artist, educator
Telephone and Fax: (310) 372-9202

We live in a world where media-driven events increasingly dominate our lives and where reality and manufactured media realities are merging into one. As artists we are presumably media literate. We know how and why to read and manipulate imagery, what to laugh at and what to take seriously. Unfortunately this is not necessarily true for everyone. Much of the world's population believe what they see on TV, believe that a photograph, a printed piece, a broadcast, bear at least some credibility. They do not always decipher successfully the vast amount of information with which they are bombarded on a daily basis. I am greatly concerned about this as we look to the information highways of the future.

My work is concerned with how we see and interact with the world. My particular concerns stem from my experiences as a mother. As my children reach adulthood and prepare to leave home, I worry whether they are prepared for the tasks and challenges ahead. Will they be savvy enough to know what to keep and what to discard? We have an education system which teaches people how to follow instructions, not how to think. Our children may be learning how to use the tools of the information age, but which among them will control the information? History has hard lessons for us about people who have lost the ability to make their own decisions. Once we've lost this ability, how do we learn from history? Increasingly I've turned to public venues for my art, using the tools of mass communication to examine both the message and the messenger. This work looks at the politics of our time, appropriating the tools and devices of the media to comment on it and the culture it's helped to create.

TANIA FRAGA

Artist; Assistant Professor, University of Brasilia
Address: R. Cesario Motta Jr. 454, ap 1401, Vila Buarque, Sao Paulo, SP, Brazil, 01221-020
Telephone: (55) (11) 231-0950

In my work I create visual languages using computers. I have established a dialogue between my work and the Constructivist and Minimalist movements of art. I have selected some of their concepts, isolated some differences, and then created a set of principles from which I work. Constructivism played an important role in the fine arts in Brazil and prepared a good foundation on which to build work mediated by computers.

My repertoire of shapes includes the Torus, the Moebius strip, the Plucker conoid and the Crosscap. These form the basis of my work, 3-D objects constructed and shaped as sculptures within the computer environment.

Since we usually think of sculptures as something that occupy a material space, the computerized, stereoscopic simulation creates a paradoxical idea: immaterial sculptures. They are sculptures with a tactile and sensual appeal, asking to be touched, but they only exist in our perceptual space. We feel both pleasure and frustration; total satisfaction cannot be achieved in this virtual space.

My work can be thought of as a metaphor for the process of thinking. We move through the shapes, then beyond them, and perceive their deepness. We feel there is a place beyond the image which we cannot clearly see. We feel the light focused inside the image. It is like what happens in our mind when we try to hold onto a thought and it goes away. We capture a chain of thought in one moment, then it shifts in a different direction while we try to keep it in the same place. There is no system of reading the image that pulls the eyes of the observer in one path or another, obliging them to follow it. There is only the appeal to the eyes to go somewhere beyond the shape itself. At the same time the interior of the shape is disclosed, illuminated. Interior and exterior are no longer two separated spaces that exclude one another. They are part of the same continuum that characterizes the stereoscopic space. We can see it but we cannot touch it. The meanings do not come from the outside world but from the perceptual and conceptual state of the viewer's mind.

PHILLIP GEORGE

The University of New South Wales, College of Fine Arts, Australia
Address: 11 Miller St. Bondi 2026, Sydney, Australia
Telephone: (612) 339-9567; Fax: (612) 339-9506

Mnemonic Notations: Memory and consciousness, two of the fundamental elements that combine to produce a blueprint of what and how we perceive ourselves and our environment, are the underlying influences that inform this work.

Past, present, future thoughts, desires, needs, wants, jumping in and out of conscious speculations. Short grasps of an idea, then a jump to the next thought, sparked by a smell, the glimpse of an image — information by installment rather than a continuum of ideas/thought. This is the way of human consciousness, all our information is processed by a nomadic thought and memory structure.

The use of a computer graphic system has empowered the user with a memory process that is without distraction, a focused and reliable reference point. This body of images is a state of perpetual change. They have been developed by making use of a computer graphic workstation, and in particular the ability of the system to file away an image and then recall it intact. This retrieval process is akin to using a bookmark. The system provides the artist with a fluid and malleable surface which can retain its surface integrity and be likened to an ever present canvas, able to be reworked and re-addressed (a perpetual malleable diary — always there and always ready). The computer memory is not subject to the ravages of the human condition, it is a very clear and irrefutable memory function. It is this artificial computer memory that has aided the production of my work.

The images are time denotations, collections of mnemonic icons, organically generated debris, detritus frozen, down-loaded for the spectator, made artifact before moving on...

"Our remarkable ability to file and retrieve shared memories is the secret of our species' evolutionary success. And anything that significantly alters the way we construct, store, or use social memory therefore touches on the wellsprings of destiny."
Alvin Toffler, *The Third Wave*

MADGE GLEESON

Artist and professor, Western Washington University
Address: Department of Art, Western Washington University, Bellingham, WA 98225 U.S.A.
Telephone: (206) 650-3674

The work alludes to the social implications of technology, with the hidden information given ubiquitous visual form through various coding processes. It plays on the tension between the hand and the machine, the familiar and the frequently hermetic. *Codex* is a reference to the historical relationship of the control of words/printing and power.

STEVE HOLZER

Independent artist
Address: 1330 cerro gordo, Santa Fe, NM 87501 U.S.A.

The challenge for the artist is how to think about this machine, how to pick it up and dance with it, and how to convey the ideas that transform our vision with it. This active collaboration of the rational sequential order, with the visionary non-linear activity of the creative process, is a demonstration of our highest conceptualization. Psychologically and physically we are coming to view our mind as a vast network of electronic activity, our brain composed of hemispheres that carry out very different functions. Socially we are evolving the dialectic of gender, and in the study of light we are challenged; is it a particle or is it a wave? These extended parameters have no aesthetic precedent, we get to redefine the form in the same way that the diminshed perspective of the Renaissance changed the rendered forever after. It is important that we are not shackled to replicating those past achievements, or that past criteria for critical assessment be used in this area. As a vehicle for visualization, the human/machine interaction is like the answer to a Zen Koan — to iterate the uniteratable!

DAVID HUSOM

Assistant Professor, University of Minnesota; Partner, Husom & Rose Photographics
Address: 1988 Stanford Ave, St. Paul, MN 55105 U.S.A.
Telephone: and fax: (612) 699-1858; Email: husom.rose@applelink.apple.com

My interest in using computers is in extending the medium of photography. In particular I wish to extend the notion of the landscape as photographed. Although landscape photography per se is a tired genre, I believe that the landscape as subject is not. Through the computer I wish to explore both the nature of the environment and our vision of the land.

My images are created by scanning photographic transparencies into an Apple Macintosh IIci. The images are then moved to a Dicomed Imaginator workstation where compositing and further manipulation is performed. The images are recorded on a 4X5 film recorder to transparency film. The finished second generation "original" film is printed in a conventional darkroom onto reversal photographic paper.

It is clear that photography as we know it is in its final hours. In this particular body of work, however, it is very important to me that the images remain "photographs." I do believe that a number of questions on the nature of the media are yet to be resolved. Issues, such as the select single point of view and perspective, the rectangular "window" onto the world and the photograph as a mirror on reality, still go unquestioned. In my work I question some of these notions.

In addition, I believe that the ephemeral natural landscape must be documented. I am continually drawn to Lake Superior, its changing light, mood, and its battles with development and destructive uses. The computer becomes another tool in the process of my exploration.

EDUARDO KAC

Artist and writer
Address: 725 W Melrose 2F, Chicago, IL 60657
Telephone and fax: (312) 871-4619; Email: u12146@uicvm.uic.edu

My work can be understood in the context of language art and visual poetry, two genres that explore the fusion of word and image. I create what I call "holographic poems," or "holopoems," which are essentially computer holograms that address language both as material and subject matter.

I try to create texts which can only signify upon the active perceptual and cognitive engagement of the reader or viewer. This ultimately means that each reader "writes" his or her own texts as he or she looks at the piece. My holopoems don't rest quietly on the surface. When the viewer starts to look for words and their links, the texts will transform themselves, move in three-dimensional space, change in color and meaning, coalesce and disappear. This viewer-activated choreography is as much a part of the signifying process as the transforming verbal and visual elements themselves.

The temporal and rhythmic structure of my texts play an important role in creating this tension between visual language and verbal images. Most of my pieces deal with time as non-linear (i.e., discontinuous) and reversible (i.e., flowing in both directions), in such a way that the viewer/reader can move up or down, back and forth, from left to right, at any speed, and still be able to establish associations between words present in the ephemeral perceptual field.

The use of computers and holography reflects my desire to create experimental texts that move language, and more specifically, written language, beyond the linearity and rigidity that characterize its printed form. I never adapt existing texts to holography. I try to investigate the possibility of creating works that emerge from a genuine holographic syntax.

DOROTHY SIMPSON KRAUSE

Professor of Computer Graphics, Massachusetts College of Art
Address: Massachusetts College of Art, 621 Huntington Avenue, Boston, MA 02115 U.S.A.
Telephone: (617) 837-1682

My work is based upon the premise that our similarities are greater than our differences and that, at this time in history, electronic media enables us to transcend our separateness and to understand, as at no time in the past, our interdependence.

Although I was trained as a painter, I have always been a collage-maker, both in my art work and in my life. I work with what I have and what I find. I use historical and current images as the source material for my work, enlarging on the fragmented political, ethical and social meanings they suggest by combining, layering, manipulating and merging them into provocative statements or questions. By focusing on timeless personal and universal issues — hopes and fears, wishes, lies and dreams, immortality and transience — I challenge myself and the viewer to look beyond the surface and to see the hidden depths.

My work uses maps, showing voyages of exploration, the shifting boundaries of acquisition or patterns of immigration, as a structural foundation. Fragments of written language — signs, symbols, charts and diagrams — are embedded in our consciousness and in my images. They require close consideration of what they represent, and their significance to our lives.

I want my work to have the quality of allegory; not to be factual, but to be truthful in character. There are no prescriptive messages, but the montaged images invite subversive readings. They question the issue of power and how it is implemented. They celebrate the dignity of the individual and the strength of the spirit. I hope that they challenge and reject both mainstream and minority perspectives and encourage individual resistance and renewal.

LIZANNE MERRILL

Independent artist
Address: 333 Rector Place #5N, New York, NY 10280 U.S.A.
Telephone: (212) 945-6115

Rocks themselves are physical records of time. It seems only natural that people began telling their own story on stone. Continuing to document the human tale, I take actual urban rocks, unearthed near construction sites, and layer them with photo emulsion. The stones are then exposed to computer generated negatives, thereby creating futuristic fossils. The rocks are then incorporated in installations demonstrating the human impact on nature.

MICHAEL R. MOSHER

Independent artist
Address: 302 Easy Street, #19, Mountain View, CA 94043, U.S.A.

The overarching mission of all my artwork is to join the best lessons and results of community mural painting and narrative digital technology.

Both murals and multimedia are friendly to the complicated and diffuse. All of my work seems content-driven and literary, and begins with a yearning and intuitive stirring-around of a topic before I have chosen its proper form. Yet in whatever media, its texture is usually characterized by profuse imagery and text, almost profligacy and an excess of information. Once accused by a painting professor of "trying to make painting do too much," I find that the computer now gives me a useful organizing and exhibition tool, while hypermedia or multimedia structures allow user-controlled access and navigation. This technology gives syntactical structures to artists with too much to say.

Devil•Food Daniel is a HyperCard-driven interactive kiosk concerning my 1973-77 memories of Dartmouth College in Hanover, New Hampshire. I remember the filmmaker Stan Brakhage thundering at a lecture in 1975, "Dartmouth College has never produced a true artist." Correct or not, the College has produced its own unique art form: the Daniel Webster portrait. Turn any corner on the campus and you are confronted with yet another version of the stern visage of its favorite son staring from a painting or sculpted bust. Now I merge Daniel W. into my self-portrait, his cerebral dome an electronic container for my feelings and recollections about our shared alma mater. Simple hypermedia links are forged between the negative (Devils), positive (Food) and net results (the Danielization) of my experience.

GEORG MÜHLECK

Independent artist; Organizer of several international exhibitions of copigraphy
Address (Germany): Im Schellenkonig 56 A, 70184 Stuttgart, Germany
Address (Canada): 4672 Christophe Colomb, Montreal, Quebec HRJ 3G6
Telephone (Germany): 49 - 711 - 23 22 26; Fax (1993): 2 62 10 93; Fax (1994): 2 36 13 42

Screen Heads — Automata Simulations is an installation using datagraphic materials based on cellular growth and modelled heads of different human races. The concept raises questions of ethnical issues, scientific playground (evolution and nature) and of the psyche of mankind in the electronic age.

In a cellular automata the state of cells is being changed. What exactly happens depends on the specific rules used. In this body of work I combined different rules (such as Langton Loops, hodge, particle beams, life, rug and others). These groups of cells are then implanted in human heads. The result is a simulation projecting thoughts and fears. But what about reality; isn't it about time to discuss the possible consequences of scientific achievement? Such achievements have always been useful on the one hand and a disaster when misused on the other. I have come to understand that not all which can be done must be done.

Pierre Dostie created an interactive soundspace for *Screen Heads — Automata Simulations*. Based on a composition of Anton von Webern he replaced (and combined through numerical treatment) tunes by spoken fragments of invented languages. One is invited to observe and communicate with human islands.

ARIBERT MUNZNER

Artist; Professor, Minneapolis College of Art and Design
Address: 2749 Bryant Avenue South, Minneapolis, MN U.S.A.
Telephone: (612) 872-4787; Email: ari@mcad.edu

GENESIS

mythology - cosmology
microcosm - macrocosm
laserlight - starlight
innerspace - outerspace

dreams within the mind
dreams within the heart

ILLUMINATIONS

JEFF MURPHY

Independent artist
Address: P.O. Box 14967, Gainesville, FL 32604 U.S.A.

I hope to suggest the convoluted nature of aesthetic procedure. That is, I am exploring how image-making mediums, like photography, become embraced in aesthetic discourse and begin to function on a formal level. Often, despite a work's reference to a concrete event, the image becomes clouded in issues of taste and judgement. Therefore, the importance of the image as a transmitter of social and cultural information becomes garbled. I hope to establish this idea by pairing historical photographs with older paintings (most often works from the Renaissance).

ANN-MARIE ROSE

Partner, Husom & Rose Photographics
Address: 1988 Stanford Ave., St. Paul, MN 55105 U.S.A.
Telephone and Fax: (612) 699-1858; Email: husom.rose@applelink.apple.com

My photographic work has a history of being organic in theme, but visually complex when expressed through use of nontraditional photographic processes. I have often mixed traditional photography with graphic art processes because of the vast arena it offers me. This loose sense of boundaries, in a visual and technical sense, has given me great opportunity to develop visual complexity and extend myself artistically. In the past I have used various photographic formats, such as hand colored silver gelatin prints made from halftoned prepress film. Most recently, I have moved towards desktop digital imaging.

My recent work is of vernacular objects and structures on public lands. I have always been drawn to photograph vernacular objects and their relationship to natural elements. I find these visually intriguing because they appear to me as forgotten elements. Often these objects are so common they lose their boundaries with natural surroundings. I believe this integration occurs because the objects do not "scream out" visually. Instead the viewer can wander from one scene to the next, exploring multiple horizons. The final print invites the viewer to go inside, notice the ordinary, then let go of the expected and seek different options of reality. I have chosen to photograph, explore and recreate this visual wandering by combining multiple photographic processes.

BILL SEAMAN

Artist; Senior Lecturar and 4-D Area Head, Media Art, College of Fine Arts, University of New South Wales
Address: Selwyn St. Paddington, 2021, New South Wales, Australia
Telephone: (612) 339-9649 or (612) 360-2870; Fax: (612) 360-2943

The Exquisite Mechanism of Shivers is an interactive videodisc installation which combines poetic text fragments, modular music segments and image sequences. The work incorporates a videodisc and computer to facilitate the combination and re-combination of a set of specific word/image/sound modules. Each module is presented as a word (or words) superimposed over a related visual image, accompanied by a musical fragment. A linear video, 28 minutes in duration, edited to an audio recording consisting of 33 short musical "movements," forms the foundation of the work. Each of the 33 sections represents a sentence comprised of ten sentence fragments.

The installation functions in the following manner. The viewer selects "Words" from a poetic text on a menu. This selection process is facilitated by scrolling through ten lists of word variables. These words function as modular linguistic sentence fragments in a preconceived sentence template which, when selected, trigger corresponding images and sound housed on a videodisc. The computer facilitates the instantaneous substitution of word/image/sound segments within the sentence template structure as derived through viewer choice. The viewer experiences the active navigation of a series of changing poetic audio/visual sentences. The work explores pluralistic meaning through the presentation of material in continuously changing alternate contexts. Humor, visual puns, word/image/sound play, modular musical composition, "canned chance," as well as sense/nonsense relations are all explored.

A non-interactive installation has also been constructed using the linear version of the image/sound modules. Video wall technology is used to position the words in sentence format, across ten monitors presented side by side. The video wall displays the sentence one module at a time while the linear soundtrack plays. After each motion segment plays on a particular monitor, the system grabs the last frame and holds the given word/phrase. Then the next monitor is activated, playing the next word/phrase, and so on, through the piece. After ten segments the next sentence begins from the first monitor, until all 330 segments have been played at which point the process starts over.

BRUCE SHAPIRO

Address: CREATIVE ROBOTICS, 7128 Mark Terrace Drive, Edina, MN 55439 U.S.A.
Telephone: (612) 942-7484; Email: CIS 71573,3276

My current work represents the fusion of robotic technology and computer graphics. While industrial use of this technique is well established, the high cost of commercial equipment has essentially prohibited its use by artists. The robotic engraver used to produce these works was constructed by myself, using parts which I scavenged from the "junk yards" of Honeywell, 3M, Unisys and Seagate. The need for custom mechanics, circuitry and software required about equal time spread between the drill press, soldering iron and C computer language.

This is but one of the possible ways in which robotics can be used as an artist's tool — it is only scratching the surface.

JOHN F. SHERMAN

Artist; Professor, University of Notre Dame
Address: Department of Art, Art History & Design, University of Notre Dame, U.S.A.

The majority of the images in my work are created by the use of specially designed alphabets that are themselves pictures or patterns. The intention of the special letterforms, in most cases, is to provide greater depth of meaning to the larger image. In other cases, the letterforms create the image in a unique texture or tonal modification.

My work reflects a number of ideas I have formulated on fusing design, art and computer technology. Chief among these ideas was to merge a typographic and visual communication into one unified composition and to accomplish this with unique technical innovations I had developed. The work is both an exercise in experimental typography and computer science.

I have described my work as experimental typography. For most people, this intention is not understood at first glance because all that is seen is an image. On closer inspection of the work, it is discovered that the larger image is constructed of smaller images that are combined by the eye. The smaller images are actually characters of a font of type I have designed. In fact, the picture is a paragraph of text and the font could be changed to another with the result of totally changing or destroying the picture. In a sense, the individual pictures (letterforms) can be seen (read) and combined to form a more complete idea than if my specially designed letterforms had not been used.

Each character of the font I design still performs the role of identifying a particular letterform; the letterform, however, ultimately is used as a picture's pixel. The first character of the font represents black, the last character is white, and in between are a range of grays. The letterforms in my fonts are both the symbol of a pixel's value and the value itself.

ROSEMARY SMITH

Artist; Educator, Minneapolis Community College
Address: 5516 Bloomington, Minneapolis, MN 55417 U.S.A.

Rosemary Smith's current body of work, *Living Fabrication*, realized through the use of electronic photography, is a metaphorical documentary about environmental concerns and feminine history. The works investigate two ends of the industrial revolution with imagery derived from nineteenth century factory life and the present mega-technology. Lace making is integral to this work as it was among the earliest of industries, bringing women and children to work in factory towns. The Jacquard punch card, essential to the lace machines, prefigured the computer.

In the work, *History Looking At Herself*, feminine "ghosts," one a shadow, one a lace figure, encapsulate and present letters written by factory girls about their lives.

Further research includes a body of photographic images and scrolls, as well as a book, *Herstory in Lace*.

CHINGYU SUN

Independent artist
Address: 196 Mott St. #33, New York, NY 10012 U.S.A.

What we think we saw, we do not see.
What we think we heard, we do not hear.
What we think we learned, we do not know.

JOHN TONKIN

Artist; Computer graphics/visualization consultant for South Australian Department of Fisheries
Address: P.O. Box 3126, Grenfall Street, Adelaide 5000, Australia
Telephone: (618) 224-0265

these are the days is a computer simulation of falling white paper. It is shown as a continual loop on a vertical format video projector or monitor.

I have worked with computer animation for seven years, developing my own graphics and modelling software. *these are the days* is derived from a series of motion studies investigating the elements air and water using three-dimensional computer animation.

By combining mathematical models of different physical phenomena such as gravity, elasticity and aerodynamics I create simulations of real world systems in virtual space. Although these simulations are relatively simplistic, the motion they exhibit is both complex and naturalistic.

As well as the formal qualities that are explored in this work, I am interested in other readings suggested by the installation:

1 Our lives are documented by a continual stream of paper. Every major and minor transition/transaction is marked on a piece of paper, from birth and death certificates to supermarket receipts.

2 The action of gravity has often been used as a metaphor for the passing of time: the falling of leaves, sand through the hour glass, pages blown from a calendar.

3 The endless stream of falling paper suggests the meditative space of a waterfall, yet also speaks of consumption and waste.

ALEX FERNANDEZ TRAUBE

Independent artist
Address: 1457 West Warner, Chicago, IL 60613 U.S.A.
Telephone: (312) 296-4866

The snapshot is an anachronism. In this era of space age-fast electronic imaging, it is the horse and buggy of personal documentation. The trouble is, we have not yet found a way to replace it, video cameras, computer imaging and Photo CD's notwithstanding. We still turn out millions of personal snapshots daily. But, we are inured to them; our eyes glaze even when we look at our own photos. How then to reconstitute them, recontextualize them, so that their bouquet of memories and feelings can be released and shared? The computer is the tool which allows me to do this.

In *Memory 1*, I have combined images of my oldest and dearest school friend with the image of his handwriting, the latter taken from a postcard. What he wrote on the card, while readable, is not as important as is the fact of the writing, the gesture itself. And the image of him is not as important as is the fact that this is a personal image. I suppose that I am attempting to enshrine both the personal note/notation and the personal snapshot, both so richly resonant.

PIERRE TREMBLAY

Address: 38 rue Herault, 92190 Meudon, France
Telephone: 46 26 02 90

This work is part of a series of images from Rodin sculptures.

I have been working over two years on portraits of sculpture. During the last year I chose to focus on a single sculptor whose work I admire, Rodin. Looking anew at those faces from a different angle seems to add a touch of poetry and colour that gives them a new life.

My process is straightforward. First, I take pictures of Rodin sculptures; then scan them. To enable me to work fast and spontaneously, my images are scanned relatively small (± 500k). I then work my images on a Macintosh computer, using Photoshop software. The last step is to shoot the images and print them.

JOAN TRUCKENBROD

Artist; Faculty, Art and Technology Dept., The School of the Art Institute of Chicago
Studio address: 14 Cari Ct., DeKalb, IL 60116 U.S.A.
Telephone: (815) 756-2447; Fax: (815) 758-1152

Diagrammatic dialogues present a metaphor for the encoding of feelings, ideas and information, and the projecting of these codes into spatial fields that are unfamiliar with the coding system and thus unable to decode the messages. Very private communication systems have evolved that limit the realm of understanding to members of an "in- group." The compartmentalization of knowledge and the fragmentation of disciplines takes place because information has been encoded differently in each discipline or subculture. As an in-depth understanding is limited to the immediate group, the integration of knowledge, or the interaction of knowledge from different groups, is inhibited. Chemical diagrams are read by chemists while electronic diagrams are readily understood by engineers and electronic technicians. This problem of understanding also applies to social groups or subcultures. For instance, women and men use the same syntax and grammar, but the meanings encoded in the words are frequently different.

According to Umberto Eco, a code is supposed to create an equivalence between elements from two systems occupying different conceptual planes. Every item in the code maintains a double set of relationships, a systematic one with all the items of its own plane, context or expression, and a "signifying" one with one or more items from the correlated plane. Eco's model for the "format of semiotic space" is similar to field theory from particle physics in which these coded items fly around and bombard one another like electrons in nuclear physical space. As these coded messages are projected at one another, they bounce off of one another if there is no interpreter that allows them to intersect. We continue to interact with dialogues occurring on different planes, as if we were speaking different languages. In the social milieu of my artwork, tangled dialogues cross different planes of experience, barely intersecting. Because of these gender-oriented encoding systems, the "other" is rarely able to construct the appropriate "decoding lens" and misunderstandings, large and small, continually occur.

ANNETTE WEINTRAUB

Artist and Professor of Art, City College of New York
Address: 138th Street and Convent Avenue, New York, NY 10031 U.S.A.
Telephone: (212) 650-7410; FAX: (212) 650-7438

My work is concerned with the artificial landscape of the urban environment, with images drawn from industrial enclaves, highways and commercial strips. These images are unified by night, and the artificial light penetrating the darkness.

This work explores a mysterious and distorted world of exaggerated and unnatural color, reflected light, and fragments of illuminated signage which seem like messages sent out into an uninhabited world. This surreal industrial landscape of factories, shopping strips and shadowy streets is uninhabited, except for the blazing neon and incandescent light which accentuates its desolation. The light references the illumination of media, movies and other entertainment, which imply an audience, yet there's no one there. Moreover, the unnatural and artificial color spectrum, while 'cheerful' and engaging, underlines a troubling separation from nature which litters the landscape with industrial waste.

I use layered imagery, in which an accumulation of images reflects the continuing cycle of urban disintegration and regeneration. This environment of the ephemeral exists outside of time or history, and is made up of the disposable components of the industrial environment. The aggregate layers of image fragments are anonymous and generic, familiar yet chilling. They express the hidden dynamism of the urban and industrial landscape, which appears alive yet without a discernable human presence—seductive, but dangerous in its threat to environment, identity and community. Cheerfully discordant, at once inviting and threatening, these pieces question the substance of our constructed environment.

Output as phase-change prints, tiled to 31 x 47 inches and laminated to museum board, the clearly artificial surface of the cold-wax print reflects the quality of artificial light and color in the nocturnal commercial environment while the grid of tiled pages reintroduces an element of the patterning and repetition of the urban environment.

CARLOS FADON VICENTE

Artist and researcher
Address: Rua Livreiro Saraiva 236, 01237-020 Sao Paulo SP, Brazil
Telephone: (55) (11) 65-5510

"The world of machines searches for the secret of creation: letters and numbers."
(Umberto Eco, *Foucault's Pendulum*)

Vectors is a series of computer generated images printed on paper. They are rendered in an interactive mode, often with the intervention of random processes.

Each work is the outcome of multiple printing stages, a procedure which alludes to collage and to montage. The printer is ranked as the production core rather than a copying device, translating the electronic digital image — non-tangible by nature — into a tangible form.

Due to random events, there are circumstances at the continuum of creation-production, where the output from the graphic station is unforeseeable. Therefore, images elaborated under such conditions are unique. The expectation of predictability and repetition normally connected to computers is thus overruled. In *Vectors* the computer assumes the status of collaborator.

The series was done between 1989 and 1990 as part of a study program at The School of the Art Institute of Chicago. About 60 pieces were made using a color ink jet printer.

Vectors gives continuity to past explorations on computer graphics as a visual medium, such as the ARTTE project which the author started in 1985. That project consisted of aesthetic and conceptual research about new media that emerge from the synergy between art and technology.

JAMES FAURE WALKER

Artist; Educator
Address: 88 Greenwood Road, London E8 1NE, U.K.
Telephone: (071) 249-7454 or (071) 249-5932

I am a painter who uses computers about a quarter of the time. In painting my objectives have had to do with harmonies of colour and light, indirectly expressed. Computers have helped me re-invent my approach to visual language, shifting the grammar, emphasizing process. It's led me to make more of the inherently painterly character of painting, elusive, still. On the computer, I am often doodling, juggling ideas about, thinking visually. Every so often I produce large works, composite prints. My own equipment is modest in comparison with that I teach with, but perhaps the cruder resolution helps by giving a texture, a limit.

MARK WILSON

Artist; Lecturer, School of Visual Arts, New York City
Address: P.O. Box 28, West Cornwall, CT 06796-0023 U.S.A.
Telephone: (203) 672-6360; FAX: (203) 672-6285

My drawings are made in a two-part process. First, color images are generated on the screen of a personal computer using a variety of computer programs. Some of these programs employ simple random procedures, others utilize permutations of graphic elements.

Next, a rectangular section of the image is plotted, pixel by pixel. The pixels are drawn as various monochromatic graphic elements that correspond to the colors of the screen image, and are then mapped onto various geometric surfaces such as planes, cylinders and cones.

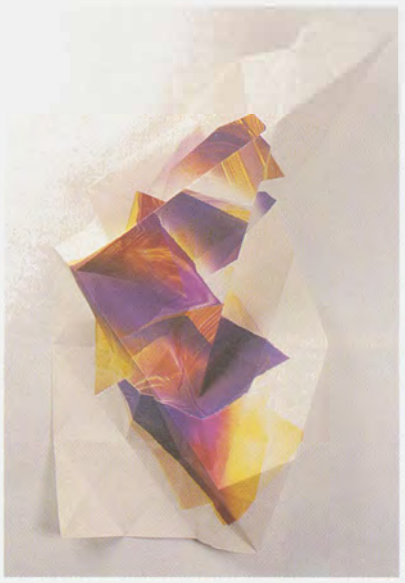
I have attempted to directly use the digital nature of this medium. Indeed, these pictures would be unrealizable in any other medium. Rather than trying to disguise pixels, they have become the central element of my artmaking.

ANNE ZAHULKA

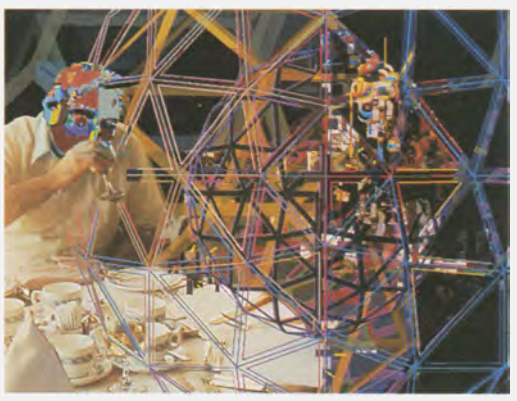
Independent artist
Address: 100 Barcom Avenue, Rushcutters Bay, Sydney, 2011, Australia
Telephone: 02 3805212; Fax: 02 3586475 (c/o Arts Law Centre of Australia)

The work included is from a continuing series which examines the language and meaning of gesture within western representations. The gesture, removed from its context (via computer graphics software), is severed from its past and magnified under the microscope of the 20th century. Computer technology enables an intervention with history and a re-writing of the values and meanings that such presentations produce. From its initial depiction in painting, the language of gesture has been a persistent means of narration both visually and symbolically. The most influential application of gesture emanated from liturgy in the proceedings of Mass and from the law courts and its judicial procedures. These rituals were concerned with communicating significance in a comprehensible form in order to maintain the power, authority and control they held over their audience.

Through careful selection and framing of gestures from the canons of religious art, portraiture and identified areas within the mass media, certain codes emerge. The gesture, removed from its original cultural matrix and used in a new context, retains its original character — it does not become simply a purely visual configuration devoid of any thematic or emotional connotation. Transplanted gestures retain their meaning and character, though they do so in a hidden and submerged way. The "framing" of the gesture is dependent on the cultural embeddedness of the image and a reiteration of the histories and systems that embody it.

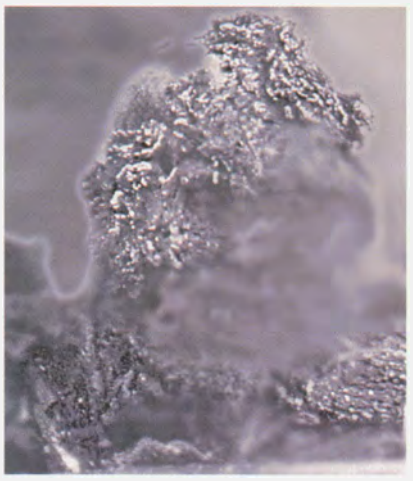


Elaine Breiger
3-D Wall Piece, 1992
etching
42 x 22 x 7"



Victor Acevedo
T3r3, 1992
IRIS ink jet print on watercolor paper
16 x 20"

Yoshiyuki Abe
LS-39, 1993
photographic print
31-1/2 x 31-1/2"



Paul Badger
Dust: From Ken Jarecke, Burned Iraqi, 1993
lithograph
11 x 14"

Romeu Bessa
Modern Cave II, 1992
computer generated image, cybachrome print
8 x 12"

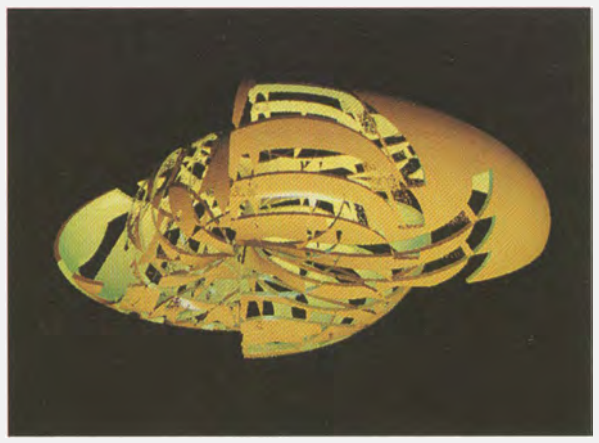
Ann-Marie Rose
The Northwest Angle(2), 1993
IRIS inkjet print
32 x 44"

Madge Gleeson
Codex, 1993
IRIS print
22 x 30"

Carol Flax
Casey, 1991
IRIS ink jet print
30 x 48" (each piece 30 x 24")

Char Davies
Drowning (Rapture), 1993
3-D computer image: photographic transparency
(duratran) in lightbox
4 x 6'

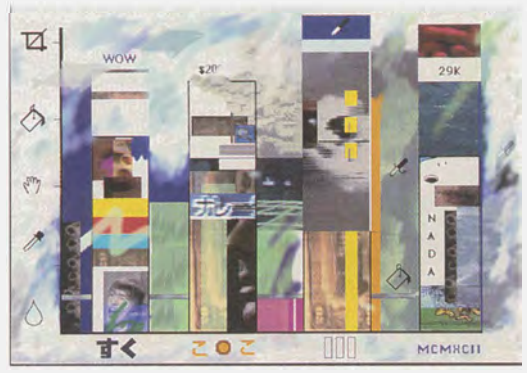
Hans Dehlinger
Three views into a landscape, 1993
Plotter drawing, ink on paper
27-1/2 x 39-1/3"



Tania Fraga
Vision in Deepness (detail), 1992
Mirror stereoscopic installation
78 x 12 x 4"

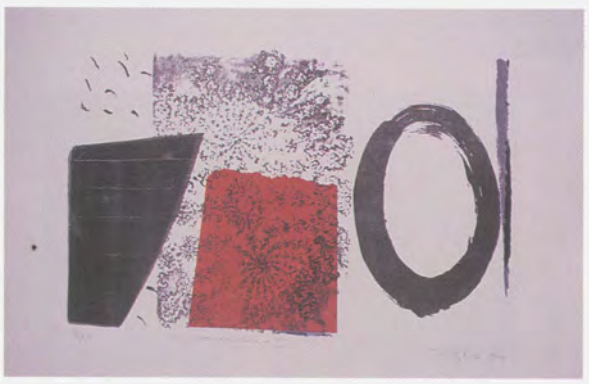
Eduardo Kac
Aduc (detail), 1991
White-light transmission computer holopoem
12 x 16"

Denis Dale
Traveling Through Time, 1992
Dye sublimation print, 8 mm & VHS video
26 x 32"



Roz Dimon
The World's Greatest Bar Chart, 1992
Digital cibatransparency Llghtbox
18 x 22 x 1-3/4"

Diane Fenster
Night Six, 1992
Fujichrome print
20 x 30"



Steve Holzer
Hypnographia III, 1992
Serigraph, M-set printout, photo process screen
7 x 11"

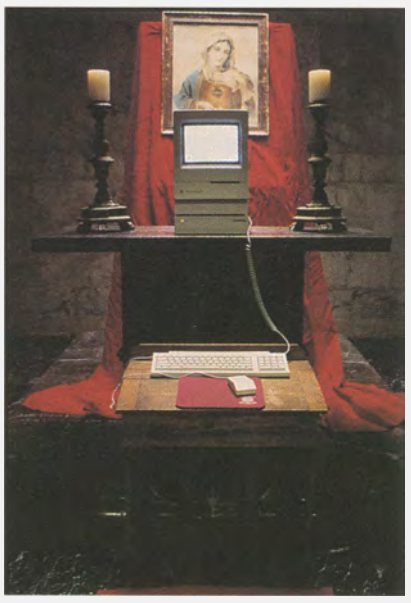
Dorothy Krause
Crusader, 1992
Digital collage
24 x 26"

Aribert Munzner
Micro/macro #13, 1986
Illuminated color transparencies
31 x 122 x 5"

Jeff Murphy
Combatants, 1993
Digital collage, tiled laser prints
39-1/2 x 57"

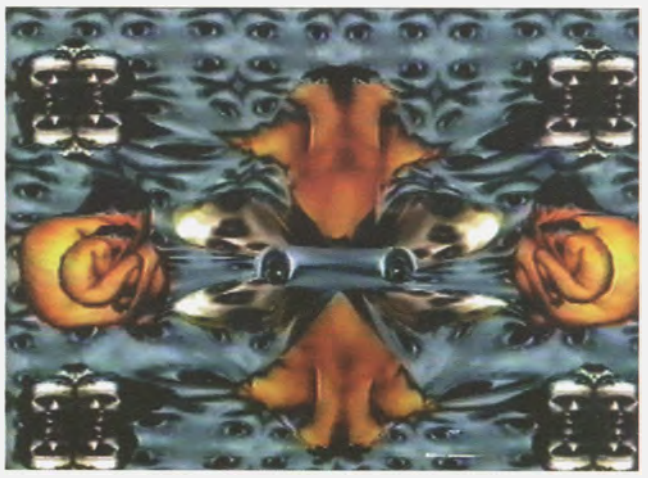
Georg Muhleck (Audio by Pierre Dostie)
All Neighbors Normal (in the End), 1993
Datagraphy laser prints
33 x 47-1/4"

Gregory Garvey
The Catholic Turing Test
Computerized confessional
Interactive Gallery



Phillip George
Headlands Mnemonic Notations #11, 1992
Gilding, gouache, collage on
color laser copier on canvas
90-1/2 x 63"

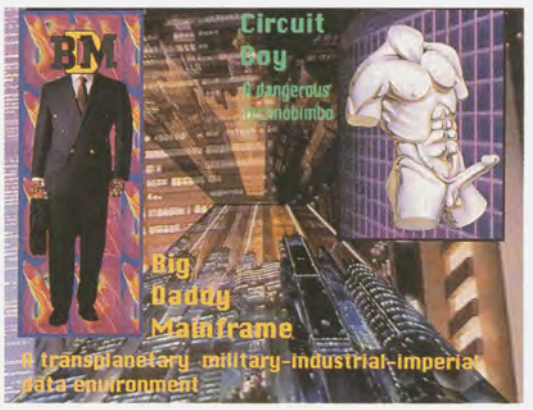
Adem Jaffers
Rave Culture
Electronic Theater, animation,
Running time: 3:00



Rosemary Smith
History Looking at Herself, 1991
4 x 5" film to photographic paper
20 x 24"

John Sherman
Signing, 1991
Linotronic print
4 x 4'

VNS Matrix
All New Gen, 1992
Interactive multimedia game
Interactive Gallery

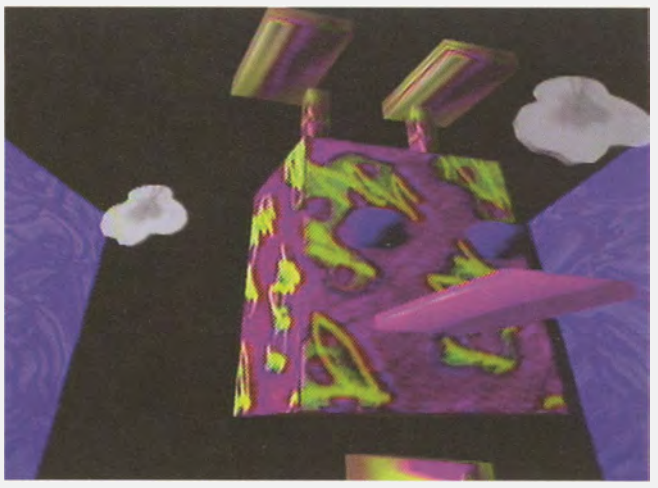


Chris Landreth
Data Driven: The Story of Franz K.
Electronic Theater, animation
Running time: 3:10

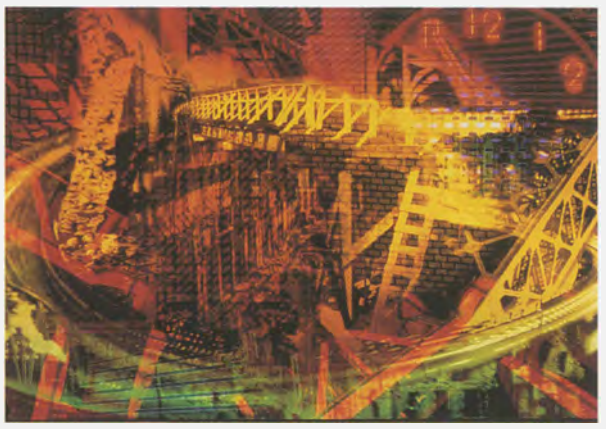
Alex Traube
Memory I, 1992
Computer generated image, C-print
20 x 24"

Joan Truckenbrod
Paradigm Inverter, 1992
Cibachrome
30 x 36"

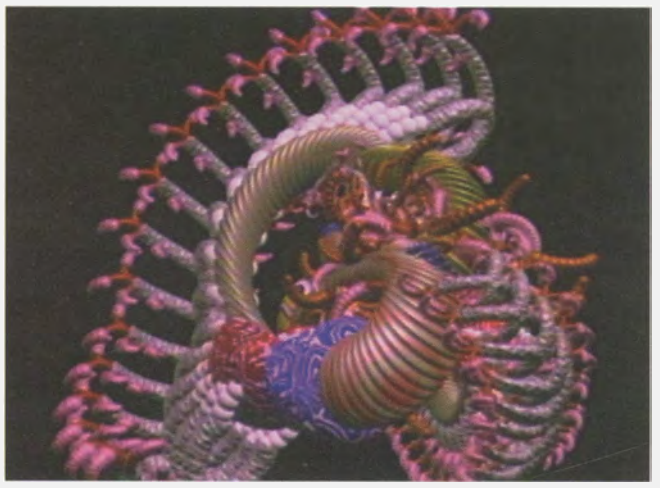
Carlos Fadon Vicente
Vector 12j, 1989
Computer graphics, ink jet print
44 x 9-1/2"



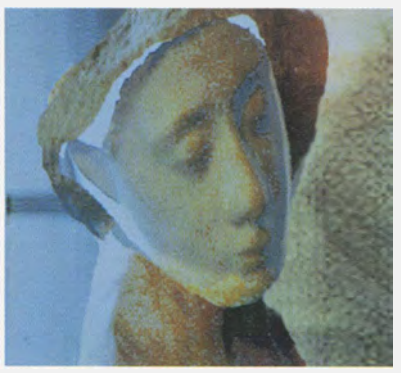
Nance Paternoster
Booli
Electronic Theater, animation
Running time: 0:40



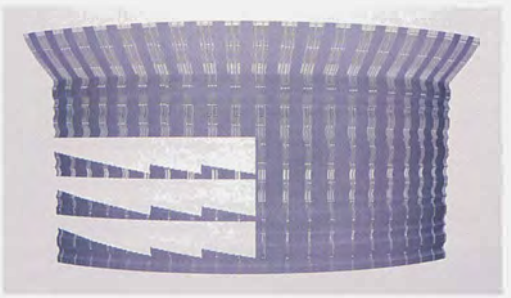
Annette Weintraub
Spiral Nebulae, 1992
Tiled and laminated phase-change print
31 x 47"



William Latham
Biogensis
Electronic Theater, animation
Running time: 1:45

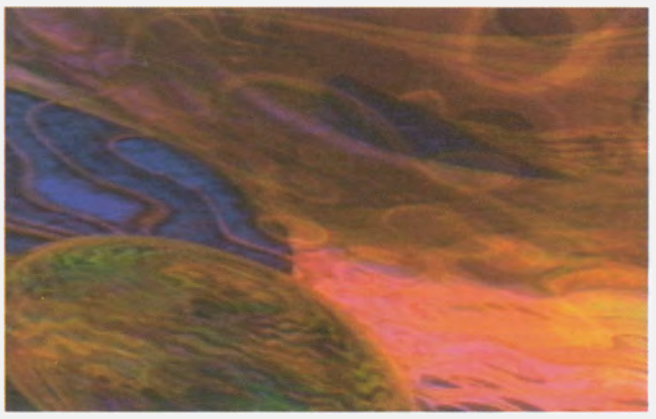


Pierre Tremblay
From Rodin, 1992
Digital photograph
8 x 10"



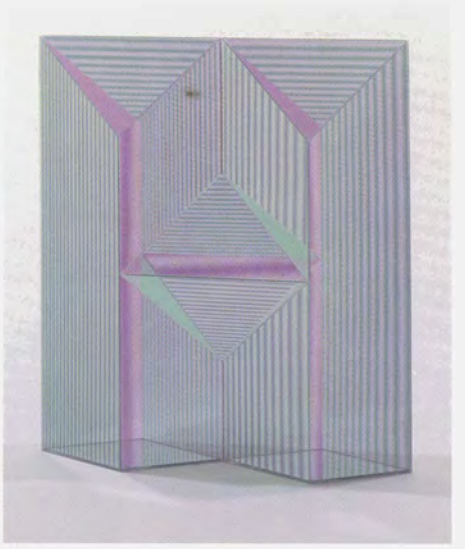
Mark Wilson
26 D 91, 1991
Monochromatic ink drawings on mylar
36 x 36"

Cheung Wai-Kwong
Sous Jantres Cieux
Electronic Theater, animation
Running time: 1:51



Chingyu Sun
I Want to Say . . ., 1991
QMS printout
17 x 17"

Jun Wantanabe
Odoro Odoro (The Mysterious Dance)
Electronic Theater, animation
Running time: 2:20



Sydney Cash
Visual Motility, 1991
Glass, computer graphics
18 x 16 x 4"

Bruce Shapiro
In Memory of Yoshitori Hattori, 1993
Painted aluminum, mixed metals
21 x 34"

INTERACTIVE GALLERY
november 03 to november 07, 1993

Interactive Art Jury: Colette Gaiter, Joy Kopp, Lisa Nebenzahl, Scott Sayre, Bradford Smith

The interaction between art and humans is traditionally defined as a "viewer" experience. While all visual art forms evoke intellectual and/or emotional responses, new forms of "interactive art" extend the traditional boundaries of art by transforming the viewer into an active participant. Experiencing an interactive work requires the participant to manipulate the work itself. FISEA 93's Interactive Gallery provides a broad range of new media, from simple circuits to biofeedback and computer vision. All of these works demonstrate the electronic artist's techniques for testing the boundaries of the aesthetic experience by demanding that the viewer go beyond visual perception to physically interact with the work of art.

Scott Sayre, chair, interactive gallery

BARRATT
da RIMINI
GARVEY
HIRANO
HÖRTNER
MALLOY
MIGNONNEAU
MIWA
OKI
PIERCE
RAPOPORT
RODEMER
RUST
SOMMERER
STARRS
STOCKER
WAGENAAR
WALL

GREGORY P. GARVEY

Professor, Concordia University, Montreal
Address: 2338 Madison, Montreal, Quebec H4B 2T6 Canada
Telephone: (514) 848-4629; Fax: (514)848-8627; Email: ggarvey@vax2.concordia.ca

The *Catholic Turing Text* takes its inspiration directly from (1) the artist's experiences as a youth with the Catholic Sacrament of Confession, and (2) the now famous test by Alan Turing for judging whether or not a computer can be said to think.

This work challenges the sinner in the confessional to decide whether or not a priest, or a computer programmed to act like a priest, is hearing the confession. The user/sinner can experience the ectasy of forgiveness in the Manichean system governed by the binary logic of good and evil where guilt, shame, sin and salvation are all input variables that determine the catechism of output: namely how many "Hail Marys" and "Our Fathers" must be said for redemption.

SABURO HIRANO

Address: chateaule Tomitsuka B210, Tomitsuka-cho 681-1, Hamamatsu-City, Shizvoka 432, Japan
Telephone: +81-53-460-2491; Fax: +81-53-475-9362

The author is interested in not only "sound" itself, but also the relationship of the environment and the sound. *Nervous Nest* is an interactive sound installation that consists of synthesizers, sensors, loudspeakers and a computer. Synthesizers controlled by the computer make insect and bird sounds in response to the ambient sounds and the movements of the audience. Japanese feel that natural sounds, such as those made by insects and birds, are beautiful—are music. *Nervous Nest* makes the audience image the place where insects are sounding, or the woods where birds are singing.

JUDY MALLOY

Book artist
Address: Box 2340, 2140 Shattuck, Berkeley, CA 94704 U.S.A.
Telephone: (415) 526-3993; Email: jmalloy@well.sf.ca.us

Through the computer, the author explores narratives that are truly nonsequential. These "narrabases" are pools of narrative information into which the reader plunges repeatedly, emerging each time with a more coherent story. The author uses small increments of information —images or words—as molecular units to form a whole. The whole describes the society in which the author lives and works. Information is used as an artist's material.

The Yellow Bowl explores the connections between the narrator's mind and the narrative. As the reader moves back and forth between a sequential, fictional story the narrator tells her daughter and the randomly displayed "true" memories that the narrator distorts to shape this story, separate but related narratives emerge. The contrast between the narrator's "memories" and the ways in which she distorts them places the reader on the uneasy ground between narrator and narrative.

Although the reader may initially choose the sequential stories, the narrator (Grace) does not end her narrative nor is all the story told in these sections. To "know" the whole story, readers must enter the radically nonsequential, disorienting, sometimes depressing "Grace Files." Even then, because of the random nature of these files, it is unlikely that any one reader will see every word in *The Yellow Bowl*.

LAURENT MIGNONNEAU and CHRISTA SOMMERER

Address: Institute fur Neue Medien, Hanauer LandstraBe 204-206, 6000 Frankfurt 1, Germany
Telephone: 69/436333; Fax: 69/439201

The artifical growing of program-based plants is an expression of the desire to discover the principle of life, which is always defined by the transformations and morphogenesis of certain organisms.

Interactive Plant Growing deals with the sensitive relationship between real plants and human viewers. By touching or moving their hands towards the real plants, viewers can influence and control in real time the virtual growth of program-based plants which are simultaneously displayed on a video screen in front of the viewers. By producing a sensitive interaction with the real plants, the viewers too become a part of the installation.

Since it takes some time for the viewer to discover the different levels for modulating and building the virtual plants, the viewer will develop a higher sensitivity and awareness of real plants.

KEISUKE OKI

Digital Therapy Institute, Tokyo, Japan
Address: 40-17-301, Oyamacho, Shibuya-Ku, Tokyo 151, Japan
Telephone: 81-3-2460-2678; Fax: 81-3-3460-2678

The Digital Therapy Institute is a group of artists, computer engineers, musicians and scientists formed in 1991 to develop audio-visual softwares. *Brain Wave Rider*, developed by DTI, is a game machine directly controllable by the brain of the player.

BWR detects the player's brain wave (Alpha, Beta, Theta or Delta) to change the speed or conditions of a vehicle moving forward in the computer-generated "landscape." The most distinctive feature of BWR's human-machine interface is that it uses the brain wave as a trigger so that it can make physical change without physical action. The player controls the computer's graphic image, sound and vibration by practicing meditation or mental calculation, namely, by changing his/her brain wave.

SONYA RAPOPORT

Independent artist
Address: 6 Hillcrest Court, Berkeley, CA 94705, U.S.A.
Telephone: (510) 658-4741; Fax: (510) 642-0336

SEXUAL JEALOUSY: the Shadow of Love is a computer-assisted interactive installation with music in which participants investigate the sources of their jealousy and methods for coping with their feelings. The artwork employs metaphorical illustrations and direct questions to probe the intensely personal and currently highly visible subject of sexual jealousy. The title refers to the observation that the jealousy reflects or "shadows" the initial reason for the attraction.

In the Hypercard stack are "attraction" sequences "played" by Indonesian puppets. Soap opera clips illustrate methods of coping with sexual jealousy. Depending on the attraction and coping choices made by the participant, the computer ultimately displays, then prints-out, a pair of footprints that lead to a "shadow message." The message, excerpted from a movie script, is revealed on a nearby monitor where all possible footprint combinations are displayed.

An interactive multi-channel computer music installation by composer Michael McNabb surrounds the computer area. A distant, algorithmic composition, evocative of Javanese court gamelan, is in dialogue with the computer program. Participants make choices on the Macintosh that signal composition changes. Musical variation is set corresponding to one of the five attraction (emotion) messages from the computer. Six instruments representing coping (action) normally play sparsely until the coping action message brings the relevant instrument to the foreground. When a "shadow message" is revealed, a real-time spatial musical composition (including five previous "revelations") is performed.

Aubrey Beardsley drawings, Indonesian shadow puppets and Jungian mythological images accompany the text. Marie Sat assisted with graphics. Ed Payne is the software designer; Dr. Ayala Pines the consulting psychologist.

MICHAEL RODEMER and CHRISTOPH RUST

Address - M. Rodemer: Department of Art and Technology, School of the Art Institute of Chicago, 37 South Wabash Avenue, Chicago, IL 60603
Address - Christoph Rust: Ohlauerstr. 3, D-3012 Langenhagen, Germany

The labyrinthine form may be seen as a metaphor for life's journey, or for the tortuous in's and out's of the art market, or for the discovery and development of the personality.

The FISEA 93 installation is a labyrinth equipped with sensors coupled to a computer. The visitor walking through the maze hears, via cordless headphones, previously recorded spoken text. The texts overlay a dimension of meaning onto the physical aspect of the maze and encourage a consideration of the interaction between the physical and psychological levels of the artwork.

VNS MATRIX

Contact: Josephine Starrs, artist
Address: 22 Dunks Street, Parkside, Adelaide 5063, Australia
Telephone: (618) 271-0135; Fax: (618) 211-7323

VNS Matrix is a group of four women artists (Josephine Starrs, Julianne Pierce, Francesca da Rimini and Virginia Barratt) who are committed to redefining the role and image of women in art and technology. Both as makers and users of computer-based artforms, women are significantly under-represented. However, in the world of computer graphics, women are very much present in easily recognizable forms as they are in traditional cinema and advertising, that is, objectified, stereotyped and fetishized. VNS Matrix aims to subvert this traditional image by creating characters and representations of women who are strong, defiant and active.

Form has rapidly become clichéd as computer artists have focused on technical challenges rather than structural and conceptual possibilities such as the development of new forms of narrative and representation. VNS Matrix believes that it is vitally important for new technologies to be used in a critical fashion, and that women have access to the production and consumption of these exciting new tools.

The group's current project is the development of an interactive (art) computer game entitled *ALL NEW GEN*. The hero of the game, Gen, is the antithesis of pallid and predictable computer game characters. Gen is terminator of the moral code, saboteur of Big Daddy Mainframe. Her mission — to subvert and corrupt cyberspace.

VNS Matrix are cyberfeminists with attitude. Their ironic and witty art injects a critical edge into the arena of art and new technologies, imagining and imaging alternative future worlds.

AKKE WAGENAAR and MASAHIRO MIWA

Address: Krefelderstrasse 48, 50670 Köln, Germany
Telephone: +49-221-7325525; Fax: +49-221-7325525

Animatrix is an interactive computer installation, consisting of a dance and a music program connected together.

You enter a dark room. In the room is a projection screen with the Animatrix, a computer dancer reminiscent of a Bodhisattva (a Buddhist creature in half-enlightened state), projected on it, and you hear music being played. In front of the screen is a pedestal with a joystick. When you move the joystick the dancer starts to dance, and the music changes.

You can influence the dance and the music directly and indirectly. With the joystick you can change the speed and direction of the dance, and you can change the tempo and pattern of the music. You can give an acceleration or deceleration to the speed of the dance and the music by moving the joystick fast and suddenly stopping it: the acceleration or deceleration of that moment is then preserved for both music and dance. The music can be "scratched" by simply moving the joystick in any direction; when stopping, the last played "scratch" pattern is preserved and continued.

Both the dance and the music program have complex real time algorithms underlying them, describing the composition rules in relation to the user input directly and over a longer period of time. The use of the interface is recorded and evaluated continuously. A longer, complex (not necessarily continuous) use of the interface results in more complex dance patterns of the dancer and more clear and transparent music.

G. LEE WALL

Director, Exploded View Enterprises
Address: 116 Withers Street, Brooklyn, NY 11211 U.S.A.
Telephone: (718) 349-0132

The interactive installation, *Geomorphic Architecture (a history of buildings that look like the earth)* documents a manufactured genre of architecture in which functional buildings have been designed to incorporate the shape of the earth as the main component of the structure. The installation promotes interest in the meanings of the buildings rather than the aesthetics or technical engineering.

The installation takes the form of a traditional educational or corporate exhibition design, using Edisonian technology. Information is presented in an explicative manner; the content is non-fictional.

The quiz-boards featured in the installation are labeled as being created by Exploded View Enterprises (EVE). The name is derived from the exploded view diagram which is a technical illustration that shows separately, but in proper sequence and relationship, the various parts of an assembly. When defining the words (explode and view) separately, the title could be thought to refer to a detonation of one's view, an explosion of the perception. EVE provides a model for thinking and living, by suggesting knowledge through radical and active open-mindedness, supported by the simultaneous maintenance of a lucid, interrelated inventory.

The goal of the exhibition, beyond the teaching of a discarded slice of architecture history, is that viewers be exposed to extraordinary examples of the symbolic relationship that can exist between forms and functions. Perhaps a viewer might be inspired to re-examine, with a critical eye, connections between meanings and forms in his or her surroundings, work and play.

XSPACE

Contacts: Gerfried Stocker and Horst Hörtner
Address: Kernstockgasse 22-24/II, A-8020, Graz, Austria
Telephone: +43-316-912766; Fax: +43-316-912766-4

In *Wig Wag*, a public computer terminal is connected via modem to a robot set up over the roofs of the city. Visible over a long distance, this robot visualizes the messages entered into the computer by means of the international marine semaphore.

On the roof of a high neighboring building, a video camera with telelens is installed which films the robot. These pictures are fed into a computer which recognizes the signals by means of motion scanning and outputs them on screen—again as letters.

The highly suggestive force of marine imagery meets with the immateriality of digital information which is not yet surrounded by myths. The confrontation of differing communication systems constitutes a confrontation of the subjective world views they represent.

electronic theater

The Electronic Theater

Electronic Theater Jury:

Millesande Charles, Bruce Jenkins, Barry McMahon, Scott Sayre, Neil Seiling, Michael Simmons

For every integration of disparate technologies there follows an equal and opposite expansion of the creators who help to define the next innovations. In FISEA 93's Electronic Theater, synthetic environments and the artificial stage provide researchers, writers and animators with a seemingly infinite work space while simultaneously allowing them to redefine the boundaries of the fourth dimension.

On the hardware side, brute force computing is quickly losing ground to the creative mind of the "mouse-holder." If your definition of "art" involves emotional value, you will welcome the new breed of "home studio" works which redefine resolution as an affective outcome rather than a visual quality.

Scott Sayre, chair, electronic theater

Scott Sayre is currently the manager of the Minneapolis Institute of Art's Interactive Media Group. His eight years of interactive multimedia experiences include projects with the Minnesota Telecommunications Research Center, the Minnesota Pollution Control Agency, Minnesota Technology for Literacy Center, and ICONOS: the multimedia resource group.

Identity animation for The Electronic Theater was created by Alex Tylevich and Kenichiro Imaizumi.

BISHKO
BRUNNER
DIDKOVSKY
DOUGLAS
DUESING
GEORGE
INNOCENT
LANDRETH
MARISCAL
MIDGLEY
MONGEAU
PATERNOSTER
PENGILLY
ROBINSON
SARAFOPOULOS
SIFFERT
SZUMINSKA
TONKIN
WAI-KWONG
WATANABE

LESLIE BISHKO

Research assistant, Centre for Systems Science, Simon Fraser University, British Columbia
Address: Simon Fraser University, Burnaby, British Columbia, V5A 1S6, Canada
Telephone: (604) 291-3610; Fax: (604) 291-4424; Email: bishko@cs.sfu.ca

Gasping For Air: In a late summer landscape where trees and grass grow amidst industrial decay, a rusted automobile muffler flounders in a stream, struggling for breath, while a stainless steel kitchen pot flies playfully through the air. This piece is an expression of the desire for harmony, within one's self and within one's environment, and the play of tensions between the body and mind.

MATTHEW BRUNNER

Graduate Research Assistant
Address: 919 Skyline Boulevard, Portland, OR 97229 U.S.A.
Telephone: (503) 225-1130

The script for the animation, *DEATHING*, came out of a series of collaborative sessions between myself and Anya Foos-Graber, author of *DEATHING: An Intelligent Alternative for the Final Moments of Life*. The animation itself is an informative and visually powerful translation and condensation of her books, poetry and dialogues.

DEATHING presents an approach towards death which runs counter to western culture's view. First, the animation depicts the physical weight and finality we currently associate with death, embodying the fear we have of losing contact with our physical body. The next segment is a "biographical" condensation of one woman's struggle with the dying process. It reflects many of the well-documented stages leading up to death and subtly illustrates Foos-Graber's philosophy, techniques and concerns. The third segment envisions this woman's death, beginning from the full flow of bio-electrical energy around the body to the exit of consciousness and its subsequent merging with the light.

DEATHING was created for a broad audience, from art and film venues to people who are in the midst of the dying process.

M. CHEUNG WAI-KWONG

Artist
Address: 176 Avenue Jean Lolive, 93500 Pantin, France
Telephone: 44 276882

Sous d'autres cieux: L'art n'évèle pas ce qu'on charche mais une vue discontinous pour d'autre.

NICHOLAS R. DIDKOVSKY

Guitarist, composer, teacher and computer music programmer
Address: 118 East 93rd Street, Apt. 9C, New York, NY 10128 U.S.A.
Telephone: (212) 369-1733; Fax: (212) 996-4214; Email: 72250.3313@compuserve.com

THREADS permits us to glance into the inner workings of a neural net as it is training to learn a task. A neural net is a computer program which begins its life completely ignorant of the task it is to perform. It learns this task through trial and error, repetition and self-adjustment, much like a human being. In fact, a neural net structure is modeled on the interconnections of nerves in the brain. It is a programming paradigm that can result in software that outlearns its maker. *THREADS* takes us through the life of a neural net, from birth to maturity.

JOHN DOUGLAS

Artist
Address: P.O. Box 11, Towline Road, Charlotte, VT 05445 U.S.A.
Telephone: (802) 425-3244

If soup cans and American flags are the great art of the sixties, what bearing does painting, sculpture and galleries have on the nineties?

Mac-based technology allows me to bring together two avenues of work — 40x80 inch prints (Cactus™) and digital video editing (DigitalFilm™) — within a political framework. One night after strolling SoHo and receiving a certain enthusiasm for my large prints, I hung my work in a wireframe (MacTopas™) gallery. I wandered alone in my virtual show. Neatly hung, the works seemed to convey stark warnings about the violence of our culture, warnings which the art scene abstractions for the most part avoid or deny. So now, trying to keep my chin above the swamp of hardware/software upgrades, I keep working to bring it all together on video and paper.

JAMES DUESING

Animator and video artist
Address: 10 Interwood, Cincinnati, OH 45220-1822 U.S.A.
Telephone: (513) 556-0288; Fax: (513) 556-3288; Email: jduesing@headcheeese.uc.daa.edu

In *Maxwell's Demon* I have redirected my approach from hand-drawn animation to completely computer-generated work. Great attention to surface qualities and color depict complex social structures in which characters eke out an existence shaped by their culture.

Maxwell's Demon is the story of characters who have been corralled on Lorado, an industrial reservation, when their world economy shifted to being information and service based.

The process of doing this animated project developed over the course of several years. The project allowed me to finely tune techniques I initiated in creating movement extremes for the characters and environment while exploring ways to create computerized movement. The complexity and density of the movements increase as the animation progresses. The entire film took three and a half years to complete.

CHRIS GEORGE, WARREN MIDGLEY, ANARGIROS SARAFOPOULOS and KATHERINE SZUMINSKA

Contact: Chris George, artist
Address: 7 St. James Terrace, Winchester SO224PP, U.K.
Telephone: 0962 856 713

The collaborative project investigates the behavior of particle systems. The animations were generated using raw synthesizing data to derive physically or behaviorally constrained particles and objects.

TROY INNOCENT

Computer animation instructor and artist
Address: 10 McCubbin Terrace, East Doncaster, Melbourne, Victoria, Australia, 3109
Telephone: 03 696 4388; Fax: 03 696 4626

JAWPAN contains many references to contemporary Japanese culture, especially their emulation of western culture distorted and mutated to fit their own needs. As western culture then references the East, a loop of mutation occurs.

The theme of mutation is central to *JAWPAN* — the SD robot mutates to form the Jawpan entity, the city mutates to form the Jawpan entity, the city mutates to a world of chaos, Otaku transforms into a hero, and the whole fabric of existence is reformatted by a computer program. All mutations are directly caused by technology which both enhances and disrupts the lives of the characters in the film.

Computer graphics create an abstracted, iconic "world" in which the characters play out the basic themes of conflict and power. The narrative structure of *JAWPAN* is constantly shifting, becoming incoherent, then redefining itself. The structure is deconstructed and chaotic but still retains an underlying continuity. *JAWPAN* is an experimental montage of image and sound, as well as a narrative film. The film depicts an attitude toward technology that is fun and explorative; there is little of the prevalent "techno fear" of many current films.

CHRISTOPHER LANDRETH

Senior animator, North Carolina Supercomputing Center
Address: 3021 Cornwallis Road, RTP, NC 27709-2889 U.S.A.
Telephone: (919) 248 1141; Fax: (919) 248 1101

A single animation, *Data Driven: The Story of Franz K*, features the most sophisticated visualization tools developed at North Carolina Supercomputing Center for advanced data representation. It explores many paradigms new to the field of visualization, ranging from volume-filling rendering, to particle systems, to sonification and other methods. It features a human-like character who explores the creative process.

JAVIER MARISCAL

Artist
Address: Pellaires, 30-38, 08019 Barcelona, Spain
Telephone: (93) 3033420; Fax: (93) 3087587

Acuarinto is a facility for children created by Mariscal and Arribas for the Theme Park Huis ten Bosch - Nagasaki Holland Village.

Rather than limiting themselves to creating a traditional facility, Mariscal and Arribas conceived this project as a global space. Their first approach to global spaces was a labyrinth with "surprises" like boat journeys, storms, glass walls, quicksand and kaleidoscopes. Due to its great technical complexity this approach had to be modified. They therefore concentrated on the idea of a global space around a water labyrinth — *Acuarinto*.

The project has an aesthetic unity of colors, shapes and textures. This unity is translated to the different languages and applied to the different supports that form the project: architecture, interactive games, graphic images and a merchandising line.

The goal is to create a magical atmosphere that stimulates the imagination of the children. When children remember their visit to *Acuarinto*, it is difficult for them to distinguish what they actually saw from what they created in their imaginations.

ALAIN MONGEAU

Artist
Address: 4072 Clark, Montreal, Quebec, Canada
Telephone: (514) 987-7917; Fax: (514) 987-4650; Email: R23374@uqam.ca.bitnet

Minute Georgienne is inspired by the atmospheres found in Sergei Paradjanov's films. It is meant to pay homage to the filmmaker (an Armenian who lived in Georgia) who was prevented from directing for over 15 years. In 1982, he resumed his career and finished three films before dying in 1990. By the end of his life, although still creating colorful movies, he was a sad man, deploring all his lost time.

NANCE PATERNOSTER

Computer art technician
Address: 546 Wisconsin Street, San Francisco, CA 94107 U.S.A.
Telephone: (415) 641-1922

The artistic medium that has been most present during the entire length of my career has been computer graphics. I started in the field in 1980. Due to the limitations of technology, I have always combined computer graphics with other mediums. In the beginning, my work consisted of hand-coloured Xeroxed printouts onto paper and acetate which I developed into collages, photosilkscreens from computer-generated originals and various other mixed media pieces that worked around existing technological limitations. I have worked with large scale ink jet prints which I consider to be a pure form of output from a computer-generated image. Although the output always seems to differ somewhat from the image on the computer screen, the results fall into the category of fine art.

My newest works involve computer generated images viewed and manipulated through light sculpture of glass and neon. I have become fascinated with the concept of complete manipulation. I create compositions evoked by mood, combining the use of reality as a starting point and manipulation as a tool in the creative process. I am intrigued by the illusion of "unrealistic" dimension and try to expand an image into many directions which can lead to unpredictable visions. Overall, I am searching to generate imagery which provides a healing experience as the audience views or interacts with the piece.

SYLVIA PENGILLY

Chairman, Theory/Composition, and Director of Electronic Music Composition Studio, Loyola University
Address: 254 Orchard Road, River Ridge, LA 70123 U.S.A.
Telephone: (504) 865-2595; Email: pengilly@loyno.edu

Although I am primarily a composer, I have always been fascinated by the correlation between what the ear hears and what the eye sees, realizing that the impact of any artistic experience will be greatly amplified if it is perceived through two senses rather than one. With the advent of the computer, it is now possible to combine music, computer graphics and video in a multi-media environment which integrates all these elements.

Striving for artistic consistency, I create all elements of my works: I compose the music, create the graphics, shoot and edit the camera footage and even dance on occasion. The result, seen in *Elemental Chaos*, is a unique entertainment which is guaranteed to be unlike anything previously experienced.

MICHELLE ROBINSON

Graduate student in visualization, Texas A & M University
Address: 712 Eagle Pass, Bryan, TX 77802 U.S.A.
Telephone: (409) 845-3465; Fax: (409) 845-4491; Email: mlr@archone.tamu.edu

When i was six continues a personal study of remembered childhood events and their meaning as interpreted over time. Fascinated, yet frightened, a child watches as the furniture in his room distorts and becomes animate, then suddenly pauses as if in recognition of another presence in the room. As the furniture turns slowly toward the camera, the child realizes that *he* is the object of their attention.

HELOISA DE ABREU SIFFERT

Artist
Address: Av. Rainha Elizabeth 85/1106 Copacabana, Rio de Janeiro cep. 22081, Brazil
Telephone and fax: (021) 2471741

The animation, *Forces of Change,* was produced at Middlesex University, London, as my final project in the M.A. Computing in Design course. The animation was inspired by Taoist art and philosophy, which emphasize movement, flow, change and the cyclic interplay of polar opposites — good and bad, life and death, male and female.

The main goal was to produce swirling forms and movements portraying the Taoist view of world dynamics. Particle systems appeared to be the most suitable computer technique to achieve this, insofar as the images involved would not be a set of primitive surface elements, but rather a collection of small shapes which would move in relation to a set of rules and would be treated globally and not individually.

The following was taken into account when defining the nature of the project: the time of rendering, the power of experimentation and flexibility implicit in the technique used, and the use of the computer as a medium that could not be replaced by other traditional media.

Forces of Change achieved its main goal of representing fluidity and swirling forms closely related to concepts found in Taoist art and philosophy. It has also added to the history of abstract experimental animation, particularly in using new technology to express ideas of duality, polarity, complementary forces of transformation and incessant motion.

JOHN TONKIN

Computer graphics/visualization consultant for South Australian Department of Fisheries
Address: P.O. Box 3126, Grenfell Street, Adelaide 5000, Australia
Telephone: (618) 224 0265

air, water is a series of computer-animated studies of the elements, air and water.

By combining mathematical models of different physical phenomena such as gravity, elasticity and aerodynamics, simulations of real world systems in virtual space are created. Although these simulations are relatively simplistic, the motion they exhibit is both complex and naturalistic.

Simple rendering further abstracts the studies and focuses attention on their form and movement.

Each animation is a journey through a slowly changing, seemingly endless environment. This creates a sense of linear narrative which is both engaging yet sublime. These animations are lyrical and evocative, suggesting a range of emotional spaces.

JUN WATANABE

Artist
Address: 2-14-1 Higashi-Gotanda Shinagawa-Ku Tokyo, Japan
Telephone: (813) 5420-5311; FAX: (813) 5420-5312

ODORO ODORO (The mysterious dance):
This is a new style of black comedy.....
They were enjoying a folk dance. But A BOY was making a mistake.
What will happen in the next scene?

SOUND PERFORMANCE EVENTS

The Sound Performance Events for FISEA 93 present a wide range of aesthetic viewpoints. Some works like Fried's *Travelogue* present technology in a simple but provocative form. With similar economy in *Subash,* Janet Gilbert employs the talents of South Indian drummer Steve Goldstein, performing on electronically processed clay drums created by New York sculptor Frank Giorgini. Craig Harris, in *inDelicate Balance*, utilizes sampling technique and transforms the mindscape and sets the tone for FISEA 93's focus toward "the art factor." Kenny's premiere work, *°.°++ (star dot star plus plus)*, for five NExT computers with video projection and the new music ensemble Zeitgeist offers a view of how live interactive scores might work in the future. Other works, such as Century's *Quartet for Solo Piano*, Koykkar's *Triple Play*, and Solum's *Concerto for MIDI'd Grand Piano* show a variety of approaches to the use of technology in conjunction with the MIDI modification of conventional instruments such as the piano and its cyber relative, the sampling system. Lippe's *Music for Clarinet and ISWP* and Settel's *Hok Pwak* demonstrate the powerful potential of processing live performance. Other works such as Pengilly's *Shadows* and Beerman/Haraszti's *Night Visions* apply technology to the interactive integration of dance, video and the MIDI sound world. Gwiazda, in *theauralengine*, explores new audience venues in creating a context for sonic virtual reality. In *Guitar Toss*, Vees takes a cultural icon, the guitar, and develops its potential by cross-breeding tennis, the carnival and signal processing. Taken as a whole, these performances demonstrate that vitality and creativity in using today's technology are working wonders with the art factor.

Special mention goes to Dr. Lloyd Ultan of the University of Minnesota School of Music whose efforts laid the foundation for these performances and whose continuing support has been valuable. Members of Zeitgeist and performers John Anderson, Heather Barringer, Marita Link and Monica Maye deserve special recognition for the contribution of their performing talent. Linda Shapiro of the New Dance Ensemble, Richard Paske of the Minnesota Center for Education in the Arts and composer Michael Aubart are thanked for their contributions to the advisory panel for FISEA 93.

Homer G. Lambrecht, chair, performance and sound

Homer G. Lambrecht is a composer, a MIDI wind instrumentalist, trombonist and Associate Professor of Music at the University of Wisconsin-River Falls. He holds degrees (B.A., M.A., D.M.A.) in music theory and composition and music education. His music has been performed at such places as Carnegie Hall, ISCM-Music Days (Reykjvik), the Tenth International Music Festival (Osaka), New Music America 1980, the C. Buell Lipa Festival, the 13th Encontros Gulbenkian de Musica Contemporanea (Lisbon) and the Tage Neuer Musik (Bonn). Commissions include works for the Saint Paul Chamber Orchestra (1988, 1979), the Minnesota Orchestra (1985) and Zeitgeist (1980, 1986, 1992).

BEERMAN
CENTURY
FRIED
GILBERT
GWIAZDA
HARASZTI
HARRIS
KENNY
KOYKKAR
LIPPE
PENGILLY
SETTEL
SOLUM
VEES

performance

ELECTRIC ARTS DUO-BOWLING GREEN STATE UNIVERSITY

Contact: Burton Beerman, Clarinetist, composer, video artist
Address: 713 Champagne Avenue, Bowling Green, OH U.S.A.
Telephone: (419) 372-2836; Fax: (419) 372-2938

Night Visions features the Electric Arts Duo (Burton Beerman, clarinetist, composer, video artist; and Celesta Haraszti, dancer, choreographer, artistic director), an intermedia ensemble specializing in real-time performances of electric clarinet, dance, computers and video.

Movements of the dancer control MIDI computer music and projected video images and animations. The audience sees the dancer moving in front of a dark curtain and within a projected video system at the same time. The music is a combination of the electric clarinet and MIDI voice modules controlled by the dancer.

MICHAEL CENTURY

Director of Program Development, The Banff Centre
Address: 551 Gosvener's, Montreal, Quebec, Canada H3y 2S5
Telephone: (514) 973-5737 and (514) 932-7895

Quartet for a Solo Pianist is a composition for a single pianist playing MIDI grand piano, which allows the performer to shape the performances of a second, mechanical piano, plus the prestored texts of a male and female speaker. Its subject is the myth of the Golem.

The "Chela of Golem" is the name given in Jewish mysticism to the artificial person created by combinations of letters. The procedure, in all the tellings, is basically the same: chanting various combinations of letters, *in a particular order,* brings forth some sort of creature. It is this striking image — the speaking of vitality — that provides the idea for the soundworld of this piece, and for its shape.

JOSHUA FRIED

Composer
Address: 277 N. Seventh Street #4R, Brooklyn, NY 11211 U.S.A.
Telephone: (718) 599-3414

In *TRAVELOGUE,* the ephemeral nature of live performance and the static nature of recorded technology collide, interact and even become codependent. The title refers to feelings of dislocation, alienation, exhilaration and despair often experienced by travelers.

TRAVELOGUE is composed for two synchronized audio tape tracks and one live performer. TAPE ONE, the musical accompaniment, is heard only by the audience. TAPE TWO, which contains various vocal sounds, is heard (via headphones) only by the performer. The performer has never heard these sounds before, and yet is asked to imitate exactly what she or he hears on the headphones *with* no *lag time whatever.* The task is quite impossible; the result is a bizarre unknown language.

TRAVELOGUE is what one might call "structurally-tech." By that I mean that fundamental to it is an exploration of the technology's simplest and most basic functions and assumptions: *TRAVELOGUE* asks, "just because multitrack recording allows two things to be *recorded* in synch, must they then always be *heard together?* And, can the two-way isolation afforded by the miracle of stereo headphones be used to musical and theatrical effect?"

The technology of the recording studio, normally used to translate what is ephemeral into a permanent form, becomes the vehicle for a one-time-only live performance, evincing human qualities in the performer that would otherwise remain latent.

note on performer: Monica Maye is a singer, composer and performance artist who has been active in contemporary music since 1977. She has performed the music of numerous American composers as a soloist and as a performing member of LISTEN, an experimental vocal laboratory which she founded and directed from 1981 to 1989.

JAN GILBERT

Composer; Educator, Macalester College, St.Paul, MN
Address: 4414 17th Avenue South, Minneapolis, MN 55407 U.S.A.
Telephone: (612) 724-0756

Jan Gilbert's work has centered on the development of interdisciplinary language — crossings and translations of vocal and electronic music with poets, visual artists and choreographers.

Her intermedia collaborations include *The Cry of Thoth*, an animation setting for nine video monitors created by Millesande Charles, *Ten Incarnations* (video animation and dance) and *Fusions* (16mm film animation and dance), both created by Arch Leean. She has created numerous electroacoustic compositions and taught electronic music at Middlebury College and the University of Minnesota. She has also worked as music curator at Intermedia Arts, developing and promoting the electronic arts in Minnesota.

HENRY GWIAZDA

Composer
Address: 21 South Sixth Street #409, Fargo, ND 58103 U.S.A.
Telephone: (701) 237-5358

In his work, Gwiazda explores sonic virtual reality.

CRAIG HARRIS

Address: 686 47th Avenue, San Francisco, CA 94121 U.S.A.
Telephone: (415) 750-0684; Email: craig@well.sf.ca.us

inDelicate Balance exists at the unseen, imaginary barrier, at once on all sides, and always inside and outside. This music composition offers a perspective on contemporary existence using found sounds, live and manipulated piano sounds, and representations of sounds from the inner ear and internal world.

inDelicate Balance was realized using a combination of digital software processing and mixing techniques, and real-time sampling, processing and mixing systems. Sound objects are independently processed using room simulation software to produce distinct room environments and spatial movements. The resultant combination of sounds creates a quality of rooms within rooms and environments which transform in shape and character. Sounds are used in and out of context; character and content are transformed. Each movement is characterized by poetic expressions.

STEVE KENNY

Freelance jazz musician/composer; Computer scientist and co-founder of Integrity Solutions, a software company focused on developing applications for the NeXT computer and its operating system.
Address: 1287 Selby Avenue, St. Paul, MN 55104 U.S.A.
Telephone: (612) 659-0214

Throughout the history of notated composition, the medium of musical notes on paper has been the primary means used to communicate musical forms. The exact symbolic musical information is presented on the paper, and the nuance of style and performance is either implied by the composition or directly given at performance time by a conductor. Recent developments in 20th Century music's graphical notation systems, interactive computer graphics, computer networking and object-oriented software suggest several possible new paradigms for dealing with notational and stylistic information at the time of the performance.

The more exact symbolic and notational information can be combined with animated, abstract, rhythmic graphics in one combined form that can be seen by performers and audience as it is being musically interpreted. Indeed, the composition can be composed as it is being performed, by using special graphical user interfaces for the composers to dynamically create these symbolic and abstract "scores." Both composers and performers can exist in the same object-oriented computer network that operates on stage at the time of the performance.

**.*++ (star dot star plus plus)* is a new work for the new music ensemble Zeitgeist by Steve Kenny that uses a network of computers running NEXTSTEP and video projection to allow for the manipulation and display of a dynamic graphical score made up of iconic and animated graphical notations. The score is composed as it is being performed by any number of composers and performers acting simultaneously on the network. The meaning and construction of the icon-set is derived through a series of rehearsals with the ensemble and the dynamic composers. The audience will be given a key to the meaning and suggested interpretation of both the icons and the animations, which can occur separately or simultaneously in the dynamic score.

note on performers: Zeitgeist is a new music ensemble which includes in its repertoire over 180 compositions, half of which were written for the ensemble. Zeitgeist has produced five recordings, performed for television documentaries and created numerous collaborations with dancers, composers, poets and filmmakers.

JOSEPH KOYKKAR

Composer; Associate Professor, University of Wisconsin-Madison, Interarts & Technology Faculty
Address: 5222 Meadowood Drive, Madison, WI 53711 U.S.A.
Telephone: (608) 276-9448; Email: koykkar@macc.wisc.edu

Triple Play utilizes three pianos: an acoustic grand played by a "live" performer, an acoustic piano which receives MIDI data (Yamaha Disklavier) from a computer-based sequencer (IBM-based sequencer software by Voyetra) and a digitally sampled grand piano tuned in 1/8 tones (Ensoniq EPS - 16 sampler) which also receives MIDI data via computer. The concept behind the composition is a variation on the typical performer and tape genre where the "live" musician attempts to integrate and synchronize with a prerecorded tape usually consisting of electronic sounds. In *Triple Play*, however, the pianist must coordinate with the other two pianos to create a musically accurate performance. The end result is much closer to acoustic chamber music rather than an electronic music experience.

note on performer: Todd Welbourne is a concert pianist and Associate Professor of Piano at the University of Wisconsin-Madison.

CORT LIPPE

Composer; Music Researcher at IRCAM
Address: IRCAM, 31 rue St-Merri, 75004 Paris, France
Fax: 33-1-42-77-29-47; Email: lippe@ircam.fr

My interest in writing music for performers and real-time digital signal processing systems dates back to the late 1970's when I first had the opportunity to work with real-time computer music systems. This interest in real-time stems from the ability it offers a composer to test and develop ideas interactively — an important aspect of true musical experimentation.

Real-time signal analysis of instruments for the extraction of musical parameters gives composers useful information about what an instrumentalist is doing. High-level event detection combining the analysis of frequency, amplitude and spectral domains can provide rich control signals that reflect subtle changes found in the input signal. This real-time audio signal analysis of acoustic instruments, for the extraction of continuous control signals that carry musically expressive information, can be used to drive signal processing and sound generating modules, and can ultimately provide an instrumentalist with a high degree of expressive control over an electronic score. In addition, compositional algorithms, which also control the signal processing, can themselves be controlled by every aspect of performer input.

The dynamic relationship between performer and musical material, as expressed in the musical interpretation, can become an important aspect of the human/machine interface for the composer and performer, as well as for the listener, in an environment where musical expression is used to control an electronic score. The richness of compositional information useful to the composer is obvious in this domain, but other important aspects exist: compositions can be fine-tuned to individual performing characteristics of different musicians, intimacy between performer and machine can become a factor, and performers can readily sense consequences of their performance and their musical interpretation.

note on performer: John Anderson, who received his doctorate from Columbia University in New York, is Professor of Clarinet and Head of Woodwinds at the University of Minnesota. Dr. Anderson has become one of the foremost proponents and performers of contemporary music, having premiered many works for clarinet as well as works involving clarinet and electronic tape, synthesizer or electronic sound manipulation.

SYLVIA PENGILLY

Professor, Loyola University, New Orleans
Address: 254 Orchard Rd., River Ridge, LA 70123 U.S.A.
Telephone: (504) 737-9844 and (504) 865-2595; Email: fbmuspe@loyno.edu

Although I am primarily a composer, I have always been fascinated by the correlation between what the ear hears and what the eye sees, realizing that the impact of any artistic experience will be greatly enhanced if it is perceived through two senses rather than one. With the advent of the computer, it is now possible to combine music, computer graphics, video and performance in a multimedia environment which integrates all these elements.

In this multimedia environment, an artist can take one of two paths to accomplish his/her artistic goals. First, the artist may elect to seek out professionals in each of the fields he feels are necessary for the work, trusting that all members will be able to collaborate, working together to realize the artist's original conception. I have elected to follow a second path, one that necessitates acquiring the requisite skills myself in order to realize my artistic concepts. The obvious drawback to this approach is that a single individual cannot possibly become equally accomplished in several different areas, a fact of which I am painfully aware. However, there are also great advantages to this approach, notably that of artistic consistency. If all areas of the work are under control of the same mind, then they are automatically integrated, once adequate skills have been acquired.

In the spirit of this philosophy I create all elements of my works. I compose the music, create the graphics, shoot and edit the camera footage and even dance, sometimes with additional dancers. The result is a unique entertainment which is guaranteed to be unlike anything previously experienced.

ZACK SETTEL

Composer; Music consultant
Address: 36 rue de Montmorency, 75003 Paris, France
Telephone: (33) 1-42-7443-81; Fax: (33) 1-42-7729-47; Email: settel@ircam.uu.nrt

Hok Pwah is a twenty-minute piece for two soloists (voice and percussion) with live electronics.

The two main ideas behind the piece are: 1) to extend the role of the duet, giving the two soloists an extremely large instrumental and timbral range nonetheless based on (or controlled by) their instrumental technique, and 2) to explore the possibilities of working with electronically (live) processed text.

notes on performers: Percussionist Heather Barringer is a member of the new music quartet, Zeitgeist, and a member of composer Mary Ellen Childs' performing company, Swing Shift. She attended Cincinnati Conservatory where she studied with Allen Otte and currently freelances and teaches percussion in the Twin Cities area.

Marita Link, mezzo-soprano, has appeared with ExMachina, the Lyra Concert, the Early Music Ensemble of St. Paul and is a founding member of the Waltham Abbey Singers. She holds a degree in voice and performance from Indiana University.

STEPHEN SOLUM

Composer and educator, Minneapolis Community College
Address: 3315 Frear Drive, Minnetonka MN 55305 U.S.A.
Telephone: (612) 933-1363

As a composer I have continually embraced new technologies but always as means rather than as ends in themselves. I am more interested in how technology can be put in the service of musicality as I express it than in riding along with each new extension of power for power's sake. My work thus tends to utilize technology one step back from the cutting edge, on as small a (hardware) scale as necessary for the need envisioned, which is then fully explored for its artistic, expressive possibilities. As technology evolves to ever-higher planes, there is an almost irresistible movement toward focussing creativity on the machines themselves. I try to do my small part in resisting this trend by gratefully appropriating the work of others, then focussing my sights on the musical end. The most noteworthy technique of my recent performance compositions might be the non-literal digital voice designs which modulate and magnify the sonic effect of a performer's physical movements in a significant but controlled manner, thereby allowing the use of conventional keyboard technique to produce unconventional and powerful music.

note on performer: Susan Flaskerud holds a doctorate in solo performance from Arizona State University and a masters of music in piano from Northwestern University. She performs as a core member of The Foundry, a new music ensemble. She frequently premieres new solo piano and chamber works.

JACK VEES

Composer
Address: Yale Center in Music Technology, 18 Hughes Place, New Haven, CT 06511 U.S.A.
Telephone: (203) 773-1582

I am interested in finding ways to re-engage the listener to actively experience new music, to be more than a listener, sometimes even more than an observer. To get beyond being concert hall potatoes requires some redesign of the mode of presentation, but new music need not rely on presentation alone. "Image is everything," intoned tennis superstar Agassi in his television commercial. However, this message took on a much different meaning when it appeared during the commercial breaks while Pete Samperes was beating him like a cheap gong.

In other words, there is sometimes much fascination with the image of new, soon to be obsolete, equipment, and a lot of hype in hyper. If "interactive" focuses the spotlight on a closed loop between the player(s) and machines, the point begins to slip away.

The *Guitar Toss* is one of a continuing series of installations which incorporate low tech materials and methods. It comes out of a sloppy, tangled mass of reminiscences and associations that many others have nurtured in their own memories. Some of the tunings and timbres are deliberate reminders of things past, not so much the sounds themselves, but of those isolated moments of clarity. Today it's not so much the shared past, but a re-invented present which beckons us to step up to the line and toss a few.

BLAIR
CAIRD
CHMELEWSKI
DAVIES
DEHLINGER
DeLAPPE
DESLEY
DONGXU
DRAKE
DRAZNIN
DUFFIELD
FERGUSON
FISHER
FODEL
FORTUIN
GESS
GOSLIN
GROMALA
HAMILTON
HELMICK
HICKS
JANNEY
KAC
KERMAN
KOO
LINCOLN
LOEFFLER
MARROQUIN
McWHINNIE
MORIE
MORONI
PENNY
RAESEMAN
RIESER
ROSEN
SCHIPHORST
SCHWARTZ
SEE
SHARIR
STANLEY
STONER
SUFFERN
VICENTE

projects and applications

ELECTRONIC CINEMA

DAVID BLAIR

Address: P.O. Box 174, Cooper Station, New York, NY 10276 U.S.A.
Telephone: (212) 228-1514; Email: artist1@rdrc.rpi.edu

We are experiencing an emerging new type of independent electronic cinema identified with work such as "Wax or the Discovery of Television Among the Bees." An important topic for discussion is electronic cinema in the context of image-processed narrative, a term meant to cover fiction where both the images and the narrative are processed. This session is a maker's attempt to describe making — the making of tools, the use of tools and how ideas of story can proceed from, and to varying degrees inform, tool use.

ARTISTS AT THE ELECTRONIC FRONTIER: current research at the school of art and design, university of illinois, urbana-champaign

KATHLEEN CHMELEWSKI

Artist; Representative of AD319
Address: 2006 Boudreau, Urbana IL 61801 U.S.A.
Telephone: (217) 333-7713; Email: kathleen@uxl.cso.uiuc.edu

Two significant issues confront artists and art educators at the "Electronic Frontier." Firstly, electronic media has blurred the boundaries between professional art disciplines posing questions for artists and art educators alike. How do we accommodate this change? Secondly, the notion of "perpetually electronic art," art that never materializes outside of cyberspace, requires a serious shift in attitude by makers, educators, exhibitors and collectors of art. The non-object status of some electronic art challenges traditional art world values that covet precious, rare and valuable objects. Instead, we are contending with networks, bulletin boards and voluntary copyright agreements.

Current faculty and student research in electronic art in the School of Art & Design at University of Illinois, Urbana-Champaign, shares a regional response to the issues raised by this poster session. Examples include: digital photography and image making; sequential imaging with sound, image and text; video and quicktime movies. Additionally, current research projects of AD319 (a collaborative study group focusing on electronic art) include: (1) an international electronic art exhibition at the UIUC Krannert Museum of Art scheduled for March 1994, (2) Art Online, the University's first globally networked electronic student art gallery, and (3) a planned globally networked electronic gallery that will exhibit collaborative and individual work by AD319 members.

"PAINTING" IN VIRTUAL SPACE: toward an alternative aesthetic

CHAR DAVIES

Artist and Vice-president of Visual Research, SOFTIMAGE Inc., Montreal, Canada
Address: 3510 boul. St-Laurent, Suite 500, Montreal, Quebec, Canada H2X 2V2
Telephone: (514) 845-1636; Fax: (514) 845-5676

The artist presents her work (still images created with the interactive 3-D software SOFTIMAGE), focusing on the relation between form and content — and on the development of an alternative aesthetic to mainstream computer graphics.

Her research involves developing an aesthetic that subverts the visual conventions associated with mainstream 3-D computer graphics, in order to express an alternative vision of the world. Working with simulated light, optics and three-dimensional form in virtual space, she uses the software in such a way as to circumvent "objective" realism, Cartesian space and linear perspective, deliberately combining photo-realism with spatial ambiguity, dissolving boundaries and collapsing figure-ground. The relation between the three-dimensionality of the working space and the 2-D field of the image is a key element in her creative process. Also essential is the software's interactivity, and its capacity as an instrument for intuitive, emotional expression.

LINE-ART: algorithmic experiments and explorations into pictorial spaces composed of lines

HANS DEHLINGER, QI DONGXU

Contact: Hans Dehlinger, Professor; Director of the Institute "Design - Kunst - Computer" at the University of Kassel
Address : Department of Product Design, University of Kassel, Menzelstr. 15, D - 34109 Kassel, Germany
Telephone (home): 0561 / 408-039; Fax: 011-49-561-26055

Line-Art is a computer program designed to do line-oriented artwork, with an emphasis on algorithmically generated drawings. A fantastically rich and unique universe of such drawings exists and is worth exploring. Within the context of producing such drawings, artists push the available plotting equipment, capable of handling large formats with precision and speed, to the edge of its functionality.

From an analysis of lines and line-patterns, we can gain insight into their algorithmic generation. The idea of a computer program is found to exist, in a weaker form, for manually drawn lines as well as for electronically produced ones. To contrast both production processes reveals their specific characteristics and leads to some general morphological observations.

CRITICAL INTERACTIONS - CONSTRUCTED REALITIES

JOSEPH DeLAPPE

Assistant Professor
Address: Department of Art (224), University of Nevada - Reno, Reno, NV 89557 U.S.A.
Telephone: (702)784-6682; Fax: (702)784-6655

As an artist living in the information age, the presenter strongly believes that it is of the utmost importance to create art which critically engages the materials and ideologies of our times in the hope of understanding and affecting our very complex world. Ever since beginning his work with computers and electronic media in 1983, he has been extremely skeptical about the role of technology in art — a skepticism which today questions the validity of the pro-technology paradigm. His work has evolved from an intense examination of self and family history through image processing and traditional photographic prints, to the exploration of human-machine relations by way of images, electromechanic sculptures and interactive installations. Much of his work centers on the notion that the digitized image, constructed object or interactive installation function as conceptual virtual spaces for the critical examination of reality. Current works incorporate digital imagery, video projection, interaction, electro-mechanics, light and air fresheners in an attempt to create a synthesis of media technology, critical expression, public interaction and meaning.

NEUROHACKING: using multichannel biosignal input for computer graphics applications

TIM DESLEY, HSUEH-YUNG KOO

Contact: Tim Desley, Cray Research, Inc., 655D Lone Folk Drive, Eagan, MN 55121 U.S.A.
Telephone: (612) 683-7221; Email: tim.desley@cray.com

Emerging biofeedback technologies provide interesting form generating options for the artist as seen in current research and use of biosignal processing technology as an input device for computer graphics applications and graphical environments. A hypercube viewing application enables users to monitor and direct channels of input to control a graphical user interface.

The system can provide up to eight input channels at a resolution of one sixtieth of a second, the number of input channels only limited by the number of signal amplifiers available. The system can be configured to pick up very small neuro-muscular signals, such as eye movement and brain wave signals, in addition to the stronger neuro-muscular signals produced by other muscle groups, including those that control the hands and arms. These features suggest that biosignal processing devices do have the potential to be used in many visualization projects that require simultaneous control of multiple inputs.

BEYOND TEXT, BEYOND HIERARCHY: communication in cyberspace

WAYNE DRAZNIN

Computer Arts Program Coordinator, Cleveland Institute of Art
Address: Cleveland Institute of Art, 11141 East Boulevard, Cleveland, OH 44106 U.S.A.
Telephone: (216) 421-7472; Fax: (216) 421-7438; Email: ai182@po.cwru.edu

For most of humanity's existence, communication was confined to the spoken word and the drawn image. The exchange of knowledge was direct and inherently social. With the written word, and especially with the development of the printing press, text became the prime vehicle of communication, for it alone was storable, repeatable, "provable." It was also uni-directional and hierarchical.

For the past two generations, the paradigm of the printing press has been undermined by developments in electronic media. Under the universal glow of the television set textual forms of mass communications have been shoved into a distant third place, well behind the visual and the aural. Hierarchy, however, if anything, has intensified.

Computer mediated communications — "cyberspace" — redefines the playing field. Computer mediation now plays a significant role in every form of contemporary mass communication. Perhaps the most significant departure offered by computer mediated communication is the potential for equalization of textual, visual and aural forms, which can flow along multi-directional paths.

These potentials remain far from being realized. Entrance into this realm is largely limited to academia. More critically, the networks echo the privileging of text, to the virtual exclusion of image and sound. The fundamental question has been slow to come into focus: How will, rather, how is, this new form re-defining us?

LANDSCAPE AND SCULPTURAL ENVIRONMENT

TIMOTHY DUF FIELD

Sculptor; landscape architect
Address: 1551 Johnny's Way, West Chester, PA 19382 U.S.A.
Telephone: (215) 430-8557

The question of the computer's usefulness as chisel or hacksaw equivalent has been made redundant by a growing perception of the computer as a tool in the sense that a stage is a tool for theater. In the virtual space of the computer the demands of disparate worlds can be reconciled, can be harmonious, not dissonant.

In the computer, free of financial and practical constraints and the sheer messiness of life, the solidity and presence of sculpture and the earth can be transposed into the world of music and dance. The sculptor, the landscape architect, the artist, can merge rock with wind.

The computer shifts the emphasis onto "process" rather than "results." Therefore, for the presenter the computer is not only a tool for the design of sculptural artifacts in the landscape, but also for animation involving sculptural forms, landscapes and music.

CUTTING EDGE HARD COPY IN THE ROUND

HELAMAN FERGUSON

Sculptor; Mathematician, Supercomputing Research Center, Bowie, Maryland
Address: 10512 Pilla Terra Court, Laurel, MD 20712-5728 U.S.A.
Telephone: (301) 776-0499, or (301) 604-4270; Email: helamanf@super.org

The presenter describes and analyzes three computational, industrial, cutting technology processes, developed to make hard copy in the round artifacts in both laboratory and studio.

1 Straight line code robot. Computational numerical control (CNC) milling machine environment. Small objects (inches). Cutting tool trajectories are preprogrammed and not interactive. Tool path strategies predominate.

2 Virtual image projection. Computational global information (CGI). Sculpture studio environment. Large objects (feet). Cutting tool trajectories are real-time computer monitored and interactive. Material removal strategies predominate.

3 Straight line code robot. CAD-CAM water-jet cutting environment. Modular elements for large objects (inches and feet). Preprogrammed non-interactive. Part holding strategies predominate.

SCULPTING IN CYBERSPACE: "dance of the cybernauts"

ROB FISHER

Sculptor; Fellow, STUDIO for Creative Inquiry, Carnegie Mellon University
Address: 228 North Allegheny Street, Bellefonte, PA 16823 U.S.A.
Telephone: (814) 355-1458, or (717) 748-7648; Fax: (814) 231-1344; Email: rnfl@psuvm.edu

A unique and dramatically different art-making process was engendered by the presenter's desire to create sculpture that would be as much Science as Art while he worked on developing a huge sculpture for the exterior of the Carnegie Science Center in Pittsburgh.

Just as the tree grows organically from the earth, so did this project establish its roots in the field of Science. More than 5000 new lines of code produced a new medium for sculpture creation based on an artistic application of Voronoi Tesselation software intended for the scientific visualization of poly-crystalline growth. The resulting unique hybrid software ultimately combined architectural, scientific and engineering programs introducing scale, dimension and engineering properties. The data from this hybrid was then output to the computers at MERO Structure, space-frame fabricators. Using this data they could engineer and build the resulting sculpture. The outcome of this complex procedure is "real world" sculpture that has been determined by natural organic growth algorithms.

Dance of the Cybernauts exhibits both primitive and futurist characteristics combining intuitive child-like forms, technologic structure and scientific properties. Current developments include the production of an interactive computer animation, based on the sculpture data, projected onto the dome of the Science Center's planetarium.

TELEPAINTING

DAVID FODEL

Address: ArtLab, Inc., Box 7266, Boulder, CO 80306-7266 U.S.A.
Telephone: (303) 440-7557; Email: dfodel@aol.com

In May of this year, ArtLab produced an event called *A Virtual Classroom*. It featured demonstrations of digital media projects produced by artists in conjunction with school-aged children. These projects included a virtual puppet theater, a long distance multiple site interactive telepainting session, an interactive music workstation triggered by particpants' brainwaves, a slide show of digitally generated artworks based on old masters paintings, and a thirty second commercial produced entirely on the computer and cablecast to the community to promote the event.

A Virtual Classroom is a creative and educational experiment produced by ArtLab in conjunction with Boulder Valley School District students and teachers. Each of the featured presentations was created by Boulder Valley School District students working with a local creative professional. The goal is to introduce young people to the potentials of digital media as an art form, in the hopes of inspiring the creative exploration of emerging technologies.

ArtLab is a non-profit organization dedicated to developing the creative and educational potential of digital media.

CURVACEOUS: software for exploring the potential of the computer as musical performer

HAROLD FORTUIN

Composer; Former professor of composition at the University of Glasgow, Scotland, and Olivet College, Michigan
Address: 11265 Grenada, Sterling Heights, MI 48312 U.S.A.
Telephone: (313) 264-0848

Curvaceous, a computer program first developed by the presenter in 1991, generates any number of independent accelerating and decelerating lines using hyperbolas, each line with its own volume curve and pitch sequence, for Standard MIDI Sequencer File output. New features include:

1 continuous controller, pitch bend and monophonic aftertouch generators,

2 the ability to create a group of rhythmic lines which diverge from and converge to a central rhythmic line, which itself accelerates, decelerates or pulses steadily, and

3 the ability to create a group of pitch lines which diverge from and converge to a central pitch line.

The program can generate materials which straddle borderlines of pitch and rhythmic perception, having important applications for live performers, now and in the future.

DANCING WITH THE VIRTUAL DERVISH

DIANE J. GROMALA, YACOV SHARIR

Diane J. Gromala is a visual artist; Yacov Sharir a choreographer
Address: The University of Texas at Austin, College of Fine Arts, Austin, TX 78712 U.S.A.
Telephone: (512) 471-3365; Fax: (512) 471-7801

Dancing with the Virtual Dervish explores questions related to virtual reality, cyberspace, telepresence and aspects of art made available through emergent electronic technologies. This project, sponsored by the Canadian government, is a cross-disciplinary collaboration among visual artist Diana Gromala, architect Marcos Novak and choreographer Yacov Sharir.

Dancing with the Virtual Dervish is a distributed performance which may be conceptualized as five intertwined worlds: the Physical Performance Space, where a dancer in VR gear interacts with projections of a virtual reality and with the audience; the Virtual World, an immersive computer-simulation; Cyberworld; the Teleworld, comprised of remote, interconnected performance spaces in Austin and other cities; and Inner and Outer Body. The creative and experiential aspects become manifest when all five worlds are interconnected and continuously altered by the participation of the performers and the audience.

The group explores how virtual technologies influence the creation, experience and understanding of works of art in ways not possible in a technologically unmediated physical realm. Further, the group examines how the very nature of artistic creation is challenged and altered and how aspects of immersion and interactivity call into question the core assumptions of several art forms.

FROM SCULPTURE TO CYBERSPACE: computer modeling and rendering of sculptural forms

BRUCE and SUSAN HAMILTON

Artists
Address: Route 1, Box 5-c, Glorieta, NM 87535-9701 U.S.A.
Telephone: (505) 757-6603; Email: fbh@csn.org

In designing sculptures using modeling and rendering software, the presenters have begun to look at sculpture in a new way — animating pieces not only through space and time, but also by using shaded rate, transparency, surface displacement and texture. For instance, they have used the human figure as a texture map which is warped and displaced, creating a surreal effect. The power of new software provides them with a new visual vocabulary. The ability to create new surfaces and modify existing ones by writing procedural shaders has expanded the realm of their explorations.

In addition, Susan has been choreographing and dancing with manipulable paper sculptures designed on the computer. By using sequential video images of this dance, capturing them into the computer and placing them on, through and around their sculptures, the presenters explore the integration of these art forms.

DIGITAL PEN PLOTTERS REVISITED: the forgotten output device for computer art

RICHARD HELMICK

Professor of Environmental Design, University of Missouri
Address: University of Missouri, 142A Stanley Hall, Columbia, MO 65203 U.S.A.
Telephone: (314) 882-7470; Email: hesrich@mizzou1.missouri.edu

Pen plotters have fallen into disuse as an output device for art because film recorders, thermal printers, ink jet printers and laser printers are of high quality at an ever lower price. Pen plotter technology, on the other hand, remains basically the same as it was in 1958 when Calcomp introduced it. Even architects and engineers are toying with ink jet and thermal plotters as a replacement for the venerable pen plotter. Unexpectedly, however, sophisticated modeling, rendering and paint software can give new life to the pen plotter as an output device for art. Images from paint programs, still video cameras and rendering algorithms can be plotted. However, one must learn to see the plot as the original and the screen display as only an approximation of the plot. This reverses the habit of seeing the screen output as the original and the hard copy as a more or less faithful reproduction of it. Fill patterns from paint programs, video imagery or rendering algorithms can be plotted as outlines or parallel fill lines depending on the software used to manipulate the image. Altering plotter pens (effectively turning them into brushes, for example) can create an entirely new array of graphic possibilities with no change of software. The spectrum of graphic potential widens still further if one writes his/her own idiosyncratic code to control the plotter.

SOUND AS A VISUAL MEDIUM

CHRISTOPHER JANNEY

Director, PhenomenArts, Inc., The Institute for Performance Sculpture, Inc.; Research Affiliate, Massachusetts Institute of Technology; Visiting Professor, The Cooper Union School of Architecture
Address: 75 Kendall Road, Lexington, MA 02173 U.S.A.
Telephone: (617) 862-6413; Fax: (617) 862-6114

As a Research Affiliate at M.I.T's Center for Advanced Visual Studies and Visiting Professor in The Cooper Union School of Architecture, Christopher Janney has been working on the concept of permanent interactive architectural sound and light environments and has created numerous installations throughout the U.S.

In 1992, Janney won a national competition to create a major installation in the Miami Airport, titled *Winds of Sound/Gates of Light*. Scheduled to open in June, 1994, this 200-foot long space will evoke images of "walking through a rainbow" while listening to a soundscore based on the Florida Everglades. Additional interactive elements of light and sound will engage the strolling passengers creating a constantly changing, "living" space. Janney is also currently designing a contemporary "glockenspiel" and "sonic plaza" for the East Carolina University campus.

Of special note, Janney has been developing a desktop-animation system for both development and presentation of these environments.

RECENT EXPERIMENTS IN HOLOPOETRY AND COMPUTER HOLOPOETRY

EDUARDO KAC

Artist and writer
Address: 725 W Melrose 2F, Chicago, IL 60657 U.S.A.
Telephone and fax: (312) 871-4619; Email: u12146@uicvm.uic.edu

"Holographic poems," or "holopoems," are essentially computer holograms that address language both as material and subject matter.

Each reader "writes" his or her own texts as he or she looks at the piece. When the viewer starts to look for words and their links, the texts transform themselves, move in three-dimensional space, change in color and meaning, coalesce and disappear. This viewer-activated choreography is as much a part of the signifying process as the transforming verbal and visual elements themselves.

Such experimental texts move language, and more specifically written language, beyond the linearity and rigidity that characterize its printed form.

BEYOND THE BOOK: computer-based literature

JUDY KERMAN, convenor

Presenters: Judith Kerman, Saginaw Valley State University, Michigan
Richard Gess, Emory University, Georgia
Robert Drake, Cleveland University, Ohio
Anita Stoner, Syracuse University, New York
Address: College of Arts & Behavioral Sciences, Saginaw Valley State University, University Center, MI 48710 U.S.A.
Telephone: (517) 790-4062; Email: kerman@tardis.svsu.edu

Four working writers explore the following issues:

1 Defining the aesthetic/s:
What aesthetic structures are implied or proposed by various tools? Are different issues raised for "poetry" and "prose"? What happens to the act of "reading"? What are the implications of interactivity for the questions of authorship and audience? Are interactive forms "texts"(in the older sense) or "performances"?

2 Distribution and audience:
How do we create our audience? What lessons can we derive from the struggles between the small-press paradigm and the best-seller paradigm ?

3 Aesthetic practice: Hypertext or "Horrortext"?
What kinds of aesthetic choices by artists make these new forms work and which are merely constructive reflexes? How do we develop aesthetic standards, a genuine criticism, useful to both artists and readers?

4 Platforms and obsolescence:
How vulnerable is the form to the obsolescence of the platforms and operating systems? Are we making lasting work or ephemera?

THE ELECTRONIC VISIONARY/SHAMANIC ARTIST

JANICE LINCOLN

Artist; Art Professor, College of Art and Design, Detroit
Address: Center for Creative Studies, Foundation Department, College of Art and Design, 2 6 East K i rb get o t, MI 4 82@ U.S.A.
Telephone: (313) 752-6819

We stand in a long connecting line of visionary/shamanic artists reaching as far back as our paleolithic ancestors to the Romantic artist of the 19th century and to the Abstract Expressionist artist of the 1950's. All of these artists have tried to help us see another reality beyond the familiar surface of existence. As we stand on the threshold of a new millenium, we have the opportunity to use electronic machines such as the color copier or computer as tools of transformation to create images that are rejuvenating, redeeming and healing.

The presenter explores three themes in her work:

1 The interaction and relationship of the primitive, archaic with the personal and collective unconscious.

2 Visual synthesis of images and symbols from ancient sacred sites and images from our electronic space age. These images are both abstract and realistic.

3 Sacred geography—the relationship between culture, nature and how ancient sacred sites around the world still hold much power and teachings for us.

NETWORKED VIRTUAL REALITY

CARL EUGENE LOEFFLER

Project Director of Telecommunications and Virtual Reality, the STUDIO for Creative Inquiry, Carnegie Mellon University
Address: Carnegie Mellon University, Pittsburgh, PA 15213-3890 U.S.A.
Telephone: (412) 268-3452; Email: cel+@andrew.cmu.edu

The promise of virtual reality has captured our imagination; networks will render it accessible. There can be little doubt that networked immersion environments — cyberspace, artifical or virtual reality — will evolve into one of the greatest ventures to ever come forward. It will draw from and affect the entire spectrum of science, commerce and culture — including education, entertainment and the creative arts. It will be multi-national, and introduce new hybrids of experience for which descriptors presently do not exist.

What is virtual reality? How can it be networked? Exploration of these questions requires a discussion of the existing cultural, educational and industrial applications utilizing networked virtual reality. Included must be the Networked Virtual Art Museum, and the Networked Virtual Design Studios and Teleconferencing Sites projects produced at the STUDIO for Creative Inquiry, Carnegie Mellon University.

In a not so distant future, networked immersion environments will be utilized for industrial and creative purposes.

DIGITAL CABLE TV

RAUL MARROQUIN

Editor in Chief, *D.T.t.v.*; Director, *de Hoeksteen Live*
Address: Plantagekerlaan 24 III, 1018TB Amsterdam, Netherlands
Telephone: (020) 616-7666; Fax: (020) 624-4423

One of the most important developments in the field of the media arts in Amsterdam in the last fifteen years is the direct participation of artists in the production and programming of local television.

Desktop television is a new form of production and transmission — produced with computers and sent via modem to the relevant TV stations, thus bypassing the use of studios and cameras. Desktop television (DTTV) is generated in a newspaper/magazine fashion where text, graphics and animations are placed in relationship to one another.

Programs developed and produced in Amsterdam for cable TV may have applications for other places as well. Illustrations include the Amsterdam public access model and the presenter's weekly, *Black Hole TV*.

PAINTINGS FROM THE LOUVRE

HAROLD McWHINNIE

Address: 10111 Frederick, Kensington, MD 20795 U.S.A.

The presenter explores the use of the Golden Section and conceptions of symmetry to analyse and repurpose paintings from laser disk.

VIRTOPIA

JACQUELYN FORD MORIE and MIKE GOSLIN

Contact: Jacquelyn Ford Morie, Artist, virtual reality researcher and computer animation faculty, Institute for Simulation and Training, University of Central Florida, Orlando
Address: 321 Elkhorn Court, Winter Park, FL 32792
Telephone: (407) 658-5099; Email: morie@siggraph.org

Designed as a constantly expanding series of emotional adventures, *Virtopia* is a work-in-progress that uses virtual reality technology to create a feeling of total immersion within several three-dimensional computer generated worlds. A swirling, surrealistic desert serves as the interface for *Virtopia*. Several oases are scattered about this landscape, each with a pool that serves as a portal to an emotional experience.

Virtopia is a collaborative effort by Designer Jacquelyn Ford Morie and World Builder Mike Goslin of the Institute for Simulation and Training's Visual Systems Lab, a research division of the University of Central Florida. The project grew out of the observation that most of the virtual worlds being created today are strictly utilitarian — designed to provide opportunities such as walk-throughs of buildngs before construction begins.

Morie and Goslin feel that the true power of virtual worlds is in their potential to engage a person on very human emotional levels. Virtual reality can be a door to another world, a world as rich and fascinating as this one, if it is not used to merely re-create reality. *Virtopia* is an attempt to use this technology to open our eyes to new worlds that not only expand our sensibilities but also help us discover who we really are.

BRAZIL'S CUTTING EDGE: interactive works & moments

ARTEMIS MORONI

Artist and engineer, The *.* Group; Brazilian Advisor, FISEA 93
Address: Rod. SP 65, Km 143,6 - 13083/970, Brazil
Fax: +55-192-402029; Email: artemis@cti.ansp.br

The dynamic *. *Group brings together people from fields of both art and technology. Interdisciplinary projects emerge, reflecting the environments and technology of people's lives. Throughout time artists have resorted to whatever media were available. The *. * Group is no different. Their time is now, their media technology.

Three moments of artistic-scientific thinking — insight, production and evaluation — provide a framework for exploring three interactive installations.

In *Foreseen Variations* a robot dances to music composed with the aid of a computer. A video with a (human) dancer is shown in an electronic performance with the robot and a VHS camera captures images from the audience, including them in the work.

Beings from Aurora, evolved from the first work. The purpose of this event is to introduce technology to children in a friendly manner. Children create choreographies for a robot, acting as artists and engineers.

In *Fractal Art,* people, by their presence in the complex environment, interfere in the musical composition process being done by a PC.

ART+ROBOTICS PROJECT: an autonomous, sensing robotic artwork

SIMON PENNY and ROBERT RAESEMAN

Contact: Simon Penny, Member ISEA Board of Directors
Address: College of Fine Arts, Carnegie Mellon University, Pittsburgh, PA 15213 U.S.A.
Telephone: (412) 268-2409; Fax: (412) 268-7187attn:Penn

The robot *Petit Mal* was designed by presenter Simon Penny, with electrical engineering by presenter Robert Raeseman and mechanical engineering by Mark Needelman. The planning, development, building and testing of the autonomous robotic device is experienced through video documentation and demonstrations of the device itself.

The device is firstly an artwork, secondly a technological work, and as such raises artistic, critical and aesthetic questions in the realm of robotics. The project is an outgrowth of long term study into the phenomenon of the anthropomorphic machine. *Petit Mal* presents the visitor with a quasi-intelligent mobile sensing device which possesses qualities of "personality." Its behavior reflects the visitors' attitudes or concerns about the possibility of intelligent machines.

Since this piece is essentially a critique of the Carnegie Mellon Mars Ambler project, it strives to be everything that the Mars Ambler is not. Where the Ambler is large, cumbersome and slow, this piece is small, elegant and quick. While the Ambler is mechanically complex and unstable, *Petit Mal* is simple and stable. This design philosophy carries through to the electronic architecture of the piece. The programming of the robot is very simple, it is the complexity of the environment in which it is interacting that provides the complexity of the robot's behavior.

THE DIGITAL MURAL-PUBLIC ART AND THE COMPUTER

MARTIN RIESER

Artist; Senior Lecturer in Electronic Arts, University of the West of England, Bristol
Curator of "The Electronic Print", Arnolfini 1989
Address: 20, Elliston Road, Redland, Bristol, BS6 6QE, U.K.
Telephone: 0272 731041, Fax: 0272 763946

Rieser provides an overview of the development of large-scale computer art and digital photography used in public spaces — both poster projects and permanent installations — with particular reference to durability, available techniques of production and the relative advantages of computers for origination and visualization. The discussion includes an assessment of the growing interest in public art and photography and its convergence with digital methods. The artist's own work on computer murals, combining autographic and photographic elements, has evolved from output through digital photography to transferring images in full colour to ceramic tile surfaces and using aspects of interactivity and multimedia to enhance audience involvement. Rieser concludes with speculation on the future influence of digital technology on public art and examines projects for transmitted digital murals.

ABSTRACT MAN MACHINE

AVI ROSEN

Artist
Address: P.O. Box 8535, Nesher 20300, Israel
Telephone: 972-4-218081; Fax: 972-4-323041; Email: avi@rotem.technion.ac.il

Rosen compares past art movements like Futurism and Pop-Art, that dealt with the influence of industrialization and mechanization on humankind, with computer art. Aspects reviewed include: perception, means and language of creating art works, the concept of the "original," the roles of museums and galleries, art critics, habits of art consuming, spreading of art and its influence.

A look at the experimental Artnet in Israel and the presenter's current work and projects grounds the discussion.

COMPUTERS THAT DANCE: interacting and composing with the body

THECLA SCHIPHORST

Performing and multi-media artist; Chair, Conference on Dance & Technology, Simon Fraser University

Address: 1128 Rose Street, Vancouver, British Columbia, Canada V5L 4K8

Telephone: (604) 251-9630; Fax: (604) 251-4618 or (604) 281-4424; Email: thecla@cs.sfu.ca

In the development of computer systems that represent the body and dance as both content and formal structure, the evolution of the technological medium is as clearly affected by the articulation of dance and physical body knowledge, as dance performance and composition are affected by the articulation of technological knowledge.

An example is the evolution of the interface in the development of LifeForms, a three-dimensional computer compositional tool for dance choreography, developed at Simon Fraser University. LifeForms provides an interactive, graphical interface that enables a choreographer or animator to sketch out movement ideas in space and time. By exploring ways in which artists, such as choreographer Merce Cunningham and others, create movement ideas and are influenced by the process of creating these ideas with a computer system, we can see that this process is symbiotic and interdependent. Both the design of the LifeForms interface and the design of the task for which the system is created affect one another deeply. The interface design needs to respond to the ephemeral nature of dance itself, to attempt to comprehend something of the nature of dance and movement that resists stability, that is inherently kinetic and cannot be fully extricated from the physical bodies that manifest movement. In a recent development, whole body and gestural input utilizing a 3-D motion computer system is enabling movement to be input in real-time. The movement of the participant is "literally" sampled and displayed, and is "metaphorically" treated to influence, direct and determine what is presented and represented visually.

THE HIDDEN MONA LISA

LILLIAN F. SCHWARTZ

Co-Author, *The Computer Artist's Handbook*, (W.W. Norton); Fellow, World Academy of Art & Science

Telephone: (908) 582-4339; Fax: (908) 582-5857; Email: lil@research. ATT. com

A recent computer-aided study identified the model immortalized in Leonardo da Vinci's celebrated *Mona Lisa* to be none other than the artist himself.

A follow up investigation employing similar techniques identifies the subject of a second "Hidden?" by the same artist.

Analysis of photographic and x-ray images indicates that Leonardo first created a sketch of Isabella, Duchess of Aragon, which he later painted over with the *Mona Lisa*, using himself as the model.

Morphing software is used to show the creative decisions that Leonardo made in using his own features to change the Duchess into the *Mona Lisa* we know.

HYPERMEDIA, VIRTUAL REALITY & INTERACTIVITY: 6 cliches in search of a publicist

HENRY SEE

Artist; *A Memory Project; B*bie's Virtual Playhouse; The Glenn Gould Profile*

Address: 4371 Christophe Colomb, Montreal, Quebec, Canada H2J 3G4

Telephone: (514) 525-7810 or (514) 524-7771; Email: CDA1077@applelink.apple.com

Summarized excerpt from *"The Canadian Journal for Critical Research Arts Praxis"*: Special Issue on *"Fractals, Cyberspace & Human Identity"*:

1 In interactive environments, is the user the author of anything? What kinds of interactivity provide a genuine opportunity for creation?

2 The coherence and believability of alternate worlds emerge from the coherence of the internal structure and organization of the work, not by the application of photorealism to three-dimensional space.

3 Hypermedia can suggest what virtual reality is obliged to define.

4 The computer industry is a visual monoculture: the single crop is photorealism. As in any monoculture environment, it is a threat to the long-term survival of the ecosystem.

5 The author proposes a five-year moratorium on the use of Adobe Photoshop as a concrete first step in moving beyond the single-crop computer graphics economy.

HUMAN FACTORS RESEARCH LABORATORY

JEFF CAIRD, MARTY HICKS, and MARK STANLEY

contact: Mark Stanley, Independent Interactive Media Designer, Minneapolis, MN U.S.A.

Telephone: (612) 722-2076; Email: marks@pantry.mcad.edu

Reviewing the latest virtual reality research work being done at the University of Minnesota Human Factors Research Laboratory (HFRL), the presenters focus on the collaborative work being done with artists that utilizes the VPL system and real-time SGI computer graphics. Many of the projects undertaken required the collaboration of artists, software and hardware engineers, and perceptual psychologists to achieve the goal of understanding the interactions which transpire between people and complex machine systems.

Practical considerations for artists working with virtual reality technologies include: What are the software development packages available? What file formats are dictated by present integrative software? What access is there to the more costly graphics and I/O equipment? How does metaphor shape the artist's direction of creative energies within virtual environments?

CHAOS AND COMPUTER ART

KEVIN G. SUFFERN

Address: School of Computing Sciences, University of Technology, Sydney, P.O. Box 123, Broadway, New South Wales 2007 Australia

There are many situations where the scattering of light from reflective objects becomes chaotic in nature. Examples which have been explored in the past include small numbers of highly reflective spheres in contact with each other (Suffern and Sinclair), and light scattering on the inside of a reflective spherical cavity (Suffern, Hopwood and Sinclair). When situations like these are ray traced to high levels of recursion, interesting fractal images can result.

The presenter is currently exploring a number of ways of creating different images through the technique of placing a bump map on the inside surface of a spherical cavity. These ways include varying the bump map parameters and the colour of the objects with recursion depth. The resulting objects are completly non-physical in that they could never be built, but the beauty of ray tracing is that it can still simulate these non-physical objects to create works of art.

Chaotic scattering also occurs when light is refracted through media of variable refractive index, particularly when the refractive index is a random function of position. Suffern is currently ray tracing objects where the refractive index is a Perlin tri-cubic random function of position, by using a numerical technique developed by the presenter and P.H. Getto for tracing rays through variable refractive index media. The objects are again non-physical, and have great potential for computer art, particularly when other objects and light sources are imbedded in them or seen through them. Highly recursive situations can be ray traced by using reflective surfaces as well as using variable refractive indices.

ON STRATEGIES

CARLOS FADON VICENTE

Artist and researcher

Address: Rua Livreiro Saraiva 236, 01237-020 Sao Paulo SP, Brazil

Telephone: (55) (11) 65-5510

The presenter reviews his strategies on electronic art projects, strategies reflecting his concerns about the synergy between art and technology and accentuating the specificity of technical apparatus as one of the driving forces behind the medium itself. The approach is analytical, not necessarily coincidental with the creation-production process.

The role of low profile/low tech devices employed by the independent artist-researcher is stressed. Two actual projects are used as the basis for conceptual and aesthetical statements:

Still Life/Alive (1988). A teleart piece about image construction done in the interactive-collaborative mode, with the mediation of telecommunication systems. It was conceived as a vessel for cultural interchange.

Vectors (1989-90). A set of infographic images printed on paper and rendered in an interactive mode, often with the intervention of random processes. As a consequence, the expectation of predictability and repetition usually connected with computers is overruled.

THE EXQUISITE FAX INVITATIONAL AND THE FISEA FAX OPEN

In order to address issues raised by the art factor in fax art, two fax art projects will be undertaken for exhibition at FISEA 93. The Exquisite Fax Invitational uses fax technology to allow collaboration among artists who are widely separated by distance. The FISEA Fax Open explores the democratic aspect of fax art exhibitions made possible by the availability of fax services around the world.

The Exquisite Fax Invitational links the works of a number of artists in a grid. Each artist links their work to the images immediately preceding their position on the grid. The result is a technological update of the surrealists' "Exquisite Corpse" drawings. Due to this construction process there is a focus on free expression and the generation of unusual and unexpected imagery.

The FISEA Fax Open is open to any artist who sends an image during the symposium. Fax lines will accommodate both roll-paper fax output for non-standard length artworks and plain paper output for standard length pieces. The theme, THE FAX ART FACTOR, encourages artists to explore and expand on the use of fax technology as an art form. The artworks may address the theme directly or demonstrate the art factor by their existence as an art object.

Craig Ede, curator

Craig Ede is a painter, teacher and fax-art provocateur currently living in St. Paul, Minnesota. He has taught painting and drawing in Alabama, Minnesota and Wisconsin.

SLIDE SHOW PARTICIPANTS

Abbado, Adriano	Milan, Italy
Argyropoulos, Andy	Chicago, IL U.S.A.
Astrahan, Ilene	New York, NY U.S.A.
Azambuja, Carlos	Rio de Janeiro, Brazil
Bachelder, Steven	Stockholm, Sweden
Barta, Les	Incline Village, NV U.S.A.
Bayrle, Thomas	Frankfurt, Germany
Beams, Mary	DeKalb, IL U.S.A.
Bradford, Dan	Baltimore, MD U.S.A.
Brown, Paul	Miss State, MS U.S.A.
Burden, Jeff	Decatur, IL U.S.A.
Burke, Patrick	Washington, DC U.S.A.
Camargo, Isaac	Londrina, Brazil
Campiglio, John	Santa Fe, NM U.S.A.
Carlson, Karen	Menlo Park, CA U.S.A.
Castaldi, Damian	Annandale, New South Wales, Australia
Chamberlain, Peter	Honolulu, HI U.S.A.
Chang, Dr. Rodney	Honolulu, HI U.S.A.
Chung, Kyeng-Im	Albany, NY U.S.A.
Clark, Gary	Bloomsburg, PA U.S.A.
Colonna, Jean-Francois	France
Cramer, George	Madison, WI U.S.A.
Dade, Roger	Boscombe, Bournemouth, Dorset, U.K.
de Melo Pimenta, Emanuel Dimas	Lisbon, Portugal
de Toledo, Rodrigo Bastos	Rio de Janeiro, Brazil
DeLutri, Robert	St. Paul, MN U.S.A.
Dixon, David	Johnson City, TN U.S.A.
Dodson, Liz	Minneapolis, MN U.S.A.
Draznin, Wayne	Cleveland, OH U.S.A.
Effertz, Karin	Laudenbach, Germany
Farrell, Anne	Santa Fe, NM U.S.A.
Fisher, Rob	Bellefonte, PA U.S.A.
Freeman, Nancy	Annandale, VA U.S.A.
Gai, Marilena	Torino, Italy
Gallagher, Jean	Chico, CA U.S.A.
Gartel, Laurence	Floral Park, NY U.S.A.
Garvey, Gregory	Montreal, Quebec, Canada
Geitz, Sarah	Catonsville, MD U.S.A.
Gellman, Rachel	New York, NY U.S.A.
Glynn, David	Los Angeles, CA U.S.A.
Grancher, Valery	Lyon, France
Green, Brian	Bryan, TX U.S.A.
Greetham, Justin	Bournemouth, Dorset, England
Guzak, Karen	Seattle, WA U.S.A.
Halaby, Samia	New York, NY U.S.A.
Hammerman, Michael	Chicago, IL U.S.A.
Haveman, Josepha	Berkeley, CA U.S.A.
Holcomb, Michael	Eugene, OR U.S.A.
Horowitz, Jeff	New York, NY U.S.A.
Inakage, Hiroko	Kamakura, Kanagawa, Japan
Johnson, Peter	St. Paul, MN U.S.A.
Komatsubara, Midori	Minneapolis, MN U.S.A.
Lavers, Katie	Bayswater, Australia
Lincoln, Janice	Romeo, MI U.S.A.
Lindbloom, Terri	Tallahassee, FL U.S.A.
Little, Gregory	Oberlin, OH U.S.A.
MacArthur, Ann	Santa Fe, NM U.S.A.
Martin, Lucille	Perth, Australia
Maun, Patrick	St. Paul, MN U.S.A.
McCreary, Karen	Long Beach, CA U.S.A.
McFadden, Robert	Montreal, Quebec, Canada
McQuiston, Kurt	Cincinnati, OH U.S.A.
Millstein, Mark	Pittsburgh, PA U.S.A.
Nechvatal, Joseph	Arbois, France
Osaka, Takuro	Tokyo, Japan
Pentelovitch, Robert	New York, NY U.S.A.
Poindexter, Dave	Tallahassee, FL U.S.A.
Pravda, Kit	Menlo Park, CA U.S.A.
Riebe, Markus	Gallneukirchen, Austria
Robinson, Jeri	Lancaster, PA U.S.A.
Rollins, Kent	Ithaca, NY U.S.A.
Rosen, Avi	Nesher, Israel
Schminke, Karin	Woodland Hills, CA U.S.A.
Scott, Victoria	Santa Fe, NM U.S.A.
Seidman, Spencer	San Francisco, CA U.S.A.
Shanks, Bradlee	Tampa, FL U.S.A.
SKADADA	Bayswater, Australia
Smith, Alexa	Roseville, MN U.S.A.
Smith, C.J.	Woodburn, OR U.S.A.
Strum, Michael	Sydney, New South Wales, Australia
Struwe, Gerel	Koln, Germany
Sullivan, James	Edina, MN U.S.A.
Szamosy, Csaba	Parkville, Victoria, Australia
Todd, Kevin	West Launceston, Tasmania, Australia
Thompson, George	Overland Park, KS U.S.A.
Valesco, Frances	San Francisco, CA U.S.A.
Vander Houwen, Greg	Issaquah, WA U.S.A.
Webb, Lanny	Athens, GA U.S.A.
Whitaker, Corinne	Pasadena, CA U.S.A.
Wiese, Anja	Dusseldorf, Germany
Witte, Mary	Boise, ID U.S.A.
Woldorsky, Rochelle	Minneapolis, MN U.S.A.
Yoshihoto, Seiji	Tokyo, Japan
Zoltness, Mara	Minneapolis, MN U.S.A.

The Slide Show was curated by Judith Yourman, visual artist and Assistant Professor of Electronic Media, St. Olaf College, Northfield, Minnesota.

LISTENING CHAMBER PARTICIPANTS

Caldwell, James	Macomb, IL U.S.A.	*And gives to airy nothing* (1993)
Duesenberry, John	Brookline, MA U.S.A.	*Decline* (1992)
Franey, Colin M.	Champaign, IL U.S.A.	*Risonare C*
Gennaula, Chris	Mendota Heights, MN U.S.A.	*Purge* (1993)
Giomi, Francisco	Florence, Italy	*Chromatism* (1992)
Hass, Jeffrey E.	Bloomington, MN U.S.A.	*Liaisons* (1991)
Olson, Mike	Minneapolis, MN U.S.A.	*Song of the Badger II*
Ryan, William	Champaign, IL U.S.A.	*Point Common*
Vorn, Bill	Montreal, Canada	*Danse Macabre* (1992)

The Listening Chamber was curated by Dr. Homer Lambrecht, composer, MIDI instrumentalist and Associate Professor of Music, University of Wisconsin-River Falls.

EXHIBITION CHECKLIST

Yoshiyuki Abe, *I.S-59*, Photographic print, IBM AT compatible (80486) Homebrew framebuffer, Artist's software, 31-1/2 x 31-1/2", 1993 ▪ **Victor Acevedo**, *6.26.27.86*, IRIS ink jet print on watercolor paper. Compaq 386, Cubicomp Framebuffer Apple Macintosh IIci, Cubicomp 3D Modeler, Targa Tips, Adobe Photoshop, 16 x 20", 1991; *T5r5*, IRIS ink jet print on watercolor paper, Compaq 386, Cubicomp Framebuffer Apple Macintosh IIci, Cubicomp 3D Modeler, Stratavision 3D, Adobe Photoshop, 16 x 20", 1992 ▪ **Amy Arntson**, *Ode to Yves*, Multimedia with fresnel lenses, collaged environment, Amiga, Live, 20 x 20 x 20", 1990 ▪ **Paul Badger**, *Stone: From Ken Jarecke, Burned Iraqi*, Lithograph, 11 x 14", 1993; *Dust: From Ken Jarecke, Burned Iraqi*, Lithograph, 11 x 14", 1993 ▪ **Romeu Bessa**, *Modern Cave II*, computer generated image, cybachrome print, IBM compatible, Tempra Pro, 8 x 12", 1992; *Modern Cave VI*, computer generated image, cybachrome print, IBM compatible, Tempra Pro, 8 x 12", 1993 ▪ **Steve Bradley**, *Lamb Rib Chops*, computer, transfer, canvas, Quadra 800, Macintosh scanner, Adobe Photoshop, video spigot, 30 x 8", 1993, *Every Hour*, computer, transfer, canvas, Quadra 800, Macintosh scanner, Adobe Photoshop, video spigot, 30 x 8", 1993 ▪ **Elaine Breiger**, *3D Wall Piece*, Etching, PC, Apple Macintosh II, DGS, Adobe Photoshop, 42 x 22 x 7", 1992 ▪ **Bob Brill**, *An Evening with John Montroll - I*, Color dot matrix print, 386 computer and color dot matrix printer, Artist's software, 18-5/8 x 18-5/8", 1990, *An Evening with John Montroll - II*, Color dot matrix print, 386 computer and color dot matrix printer, Artist's software, 18-5/8 x 18-5/8", 1990 ▪ **Sydney Cash**, *Visual Mobility*, glass, computer graphics, IBM PC, Infinite Graphics IGI 2100, 18 x 16 x 4", 1991 ▪ **Kathleen Chmelewski**, *Self Portrait*, Digital collage, rice paper, Apple Macintosh IIci, Microtek Scanmaker 600ZS, Apple Personal Laserwriter NT, Adobe Photoshop 2.0, 9-1/2 x 17", 1992 ▪ **Denis Dale**, *Traveling Through Time*, Dye sublimation print, 8 mm & VHS video, Video Spigot, Video/Apple Macintosh, Nu-Vista, Adobe Photoshop 2.1, 28 x 34", 1992 ▪ **Char Davies**, *Drowning (Rapture)*, 3D computer image: photographic transparency (duratran) in lightbox, Silicon Graphics, SOFTIMAGE. 4 x 6', 1993 ▪ **Bill Davison**, *Brazilian Arcade*, Screenprint, Macintosh IIci, RastorOps 264 Card Panasonic Scanner, Frame Grabber, Adobe Photoshop, 22 x 30", 1993 ▪ **Hans Dehlinger**, *Three views into a landscape*, plotter drawing, ink on paper, Siemens WS 430, Fortran using GKS, 27-1/2 x 39-1/3", 1993 ▪ **Stewart Dickson**, *Fractal Zoom #3*, Selective Laser-sintered polycarbonate, Silicon Graphics/AT Austin SLS, artist's software, 4 x 4 x 4", 1993; *Fractal Zoom #2*, Selective Laser-sintered polycarbonate, Silicon Graphics/AT Austin SLS, artist's software, 4 x 4 x 4", 1993; *Fractal Zoom #1*, Selective Laser-sintered polycarbonate, Silicon Graphics/AT Austin SLS, artist's software, 4 x 4 x 4", 1993 ▪ **Roz Dimon**, *The World's Greatest Bar Chart*, Digital Cibatransparency Lightbox, Macintosh IIci with video vision, Adobe Photoshop, 18 x 22 x 1-3/4", 1992 ▪ **Leslie Nobler Farber**, *Confettied Chips*, print outs, fabric, dye, paint, Amiga 2000, Migraph hand scanner, IBM 386, DeluxePaint, TouchUp, Digipaint, Lumena 3.4, 32 x 27", 1992; *Sawtooth*, Print outs, paper, fabric, plastic, dye, Amiga 2000, IBM 386, DeluxePaint, Digipaint, Photolab, Lumena 3.0, 26 x 21", 1992 ▪ **Diane Fenster**, *I Waited. For Hours.*, Fujichrome print, Macintosh FX, Adobe Photoshop, 30 x 30", 1993; *Night Six*, Fujichrome print, Macintosh FX, Adobe Photoshop, 20 x 30", 1992; *Night Seven*, Fujichrome print, Macintosh FX, Adobe Photoshop, 20 x 30", 1992 ▪ **Carol Flax**, *Orrin, Or...*, IRIS ink jet print, Apple Macintosh IIci, Adobe Photoshop, 30 x 48" (each piece 30 x 24"), 1992; *Casey*, IRIS ink jet print, Targa, TIPS, 30 x 48" (each piece 30 x 24"), 1991 ▪ **Tania Fraga**, *Vision in Deepness*, mirror stereoscopic installation, HP workstation, Rayshade, 78 x 12 x 4", 1992 ▪ **Phillip George**, *Headlands Mnenmonic Notations #11*, gilding, gouache, collage on color laser copier on canvas, 486 50 MHZ, AT & T TIPS, 90-1/2 x 63", 1992 ▪ **Madge Gleeson**, *Codex*, IRIS print, IBM, Microtek scanner, Aldus Photostyler, 22 x 30", 1993 ▪ **Steve Holzer**, *Hypnographia I*, Serigraph, M-set printout, photo process screen, IBM PC, laser painter, CHAOS, TGL PLUS, Paintbrush, 6-1/2 x 7", 1992; *Hypnographia III*, Serigraph, M-set printout, photo process screen, IBM PC, laser painter, CHAOS, TGL PLUS, Paintbrush, 7 x 11", 1992 ▪ **David Husom**, *Lake Superior, WI*, Type R print,Leaf 45 Scanner, Apple Macintosh IIci, Dicomed Imaginator SI , dicomed captivator film recorder, 12 x 20", 1993 ▪ **Eduardo Kac**, *Adac*, White-light transmission computer holopoem, Macintosh holography lab, Swivel Pro, MM Director, 12 x 16", 1991 ▪ **Dorothy Krause**, *Crusader*, Digital collage, Macintosh Quadra 700, IRIS 3047, Adobe Photoshop, Color Studio, 24 x 26", 1992 ▪ **Lizanne Merrill**, *In Memory*, Fractal photo, fabric, dirt, wood, rocks, photo emulsion, Commodore Amiga, Scene Animator, 36 x 24"/ 24 x 10", 1993 ▪ **Mike Mosher**, *Devil's Food Daniel*, Acrylic on foamcore, Apple Macintosh SE, Apple Macintosh, HyperCard, facade: 10-1/2 x 16 ▪ **Georg Muhleck** (Audio by Pierre Dostie), *Screen Heads - Automata Simulations (All Neighbors Normal in the End)*, Datagraphy laser transfers on aluminum, edition of three, Apple Macintosh, Amiga 2000, DAT recorder, digital sampler, keyboard controlled sequencer, CaSim, Adobe Photoshop, Screen Machine, 33 x 47-1/4", 1993 ▪ **Aribert Munzner**, *Genesis, Digital Triptych 93-1*, Illuminated color transparencies, Artronics BFA -3M , CPM-86 Paint Program, 31 x 122 x 5", 1993 ▪ **Jeff Murphy**, *Combatants*, Digital collage, tiled laser prints, electronic paper (Laser printer paper), Adobe Photoshop, 39-1/2 x 57", 1993 ▪ **Ann-Marie Rose**, *The Northwest Angle (2)*, IRIS inkjet print, Leaf 45 scanner, Apple Macintosh II ci, IRIS inkjet printer, Adobe Photoshop, 32 x 44", 1993 ▪ **Bill Seaman**, *The Exquisite Mechanism of Shivers*, Interactive Videodisc, video disc, Apple Macintosh II, Quadra, Stereo audio system, Reverb, Video Computer Monitor, HyperCard 2.1, Variable / 27 min. linear video, more than 10 to the 33rd power of possible combinations in the Sentance Player alone (you could spend your entire life and not repeat a sentence). Text c1990, Videodisc c1991 ▪ **Bruce Shapiro**, *In Memory of Yoshitori Hattori*, painted aluminum, mixed metals, Artist-built robotic engraver, Design CAD, 21 x 34", 1993 ▪ **John Sherman**, *Signing*, Linotronic print, NEXT, PostScript, 4 x 4', 1991 ▪ **Rosemary Smith**, *History Looking at Herself*, 4 x 5" film to photographic paper, Scanner/computer to film recorder, 20 x 24", 1991 ▪ **Chingyu Sun**, *I Want to Say...*, QMS printout, Apple Macintosh IIFX, Adobe Photoshop, 17 x 17", 1991 ▪ **John Tonkin**, *these are the days*, video installation, single monitor, Amiga, artist's software, 1993 ▪ **Alex Traube**, *Memory I*, Computer generated image, C-print, 20 x 24", 1992 ▪ **Pierre Tremblay**, *From Rodin*, digital photography, Macintosh IIci, Adobe Photoshop, 8 x 10", 1992 ▪ **Joan Truckenbrod**, *Paradigm Inverter*, Cibachrome, Compaq 386, Lumena, 30 x 36", 1992 ▪ **Carlos Fadon Vicente**, *Vector 10a*, computer graphics, ink jet print, 21-1/2 x 9-1/2", 1989; *Vector 10e*, computer graphics, ink jet print, 66 x 9-1/2", 1989; *Vector 12j*, computer graphics, ink jet print, 44 x 9-1/2", 1989 ▪ **Carlos Fadon Vicente**, *Vector 12q*, computer graphics. ink jet print, 33 x 9-1/2", 1989 ▪ **James Faure Walker**, *Drop*, inkjet on Kapa, Amiga, Xerox 4020, Deluxe Paint III, Digipaint, 40 x 30", 1993 ▪ **Annette Weintraub**, *Spiral Nebulae*, Tiled and laminated phase-change print, Macintosh II, RasterOps 364 card, Wacom tablet, Adobe Photoshop, PosterWorks, 31 x 47", 1992 ▪ **Mark Wilson**, *26 D 91*, monochromatic ink drawings on mylar, IBM PS/2, IBM pen plotter, artist's software, 36 x 36", 1991 ▪ **Anne Zahalka**, *Silence...*, Cibachrome prints, Apple Macintosh, Quadra 950, ColorStudio 1.5, 72 x 24", 1993

INTERACTIVE CHECKLIST

VNS Matrix (Virginia Barratt, Francesca da Rimini, Julianne Pierce, Josephine Starrs), *All New Gen*, interactive multimedia game, Macintosh Quadra, color monitor, printer ▪ **Gerfried Stocker, Horst Hortner**, *Wig Wig*, robotic message transmission, input terminal, stereo controlled robot, video camera, computer-vision decoder, output terminal ▪ **Laurent Mignonneau, Christa Sommerer**, *Interactive Plant Growing*, user controlled growth of computer generated plants, live plants, Silicon Graphics Indigo Extreme, video projector, projection screen ▪ **Digital Therapy Institute: Keisuke Oki**, *Brain Wave Rider*, brain wave controlled game vehicle, 2 bodysonic board, TV monitor, bodysonic chair ▪ **Akke Wagenaar, Masahiro Miwa**, *Animatrix*, user controlled virtual dancer, Silicon Graphics Indigo Elan, data projector, Macintosh Powerbook, Akia s-1000 sampler, audio mixer, 2 speakers ▪ **Gregory Garvey**, *The Catholic Turing Test*, computerized confessional. Macintosh Plus, kneeler, artwork ▪ **Michael Rodemer**, *Lifewalk*, interactive audio labyrinth, suspended labyrinth, Macintosh IIfx, infrared sensors, headphones ▪ **Stewart Dickson**, *Topological Slide*, platform for traversing topological surfaces in virtual reality, 2 Silicon Graphics Indigo Extremes, headgear, plat form ▪ **Saburo Hirano**, *Nervous Nest*, interactive sound environment, Macintosh II, amplifier, sensors, mixer, 4-speakers ▪ **Sonya Rapoport** (composer: Michael McNabb), *Sexual Jealousy: The Shadow of love*, interactive Hypercard program with MIDI sound environment, Macintosh IIci, NEXT computer, Laserwriter, amplifier, 4-speakers ▪ **Lee Wall**, *Geomorphic Architecture*, eight interactive quiz boards with mounted panels, custom-made quiz boards

ELECTRONIC THEATER CHECKLIST

Sylvia Pengilly, *Environmental Chaos*, 3:00 ▪ **Thomas Bayrle**, *A moment of Finnegans Wake*, 5:00 ▪ **Alain Mongeau**, *Minute Georgienne*, 3:00 ▪ **James Duesing**, *Maxwell's Demon*, 6:30 ▪ **Jun Watanabe**, *Odoro Odoro*, 1:45 ▪ **Nick Didkovsky**, *Threads*, 2:00 ▪ **Heloisa Siffert**, *Forces of Change*, 2:00 (excerpt) ▪ **Herve Huitric**, *la grande roue*, 2:00 (excerpt) ▪ **John Tonkin**, *Air*, 3:00 ▪ **Chris George, Warren Midgley, Anargiros Sarafipoulos, Katherine Szuminska**, *Floating Point*, 2:00 (excerpt) ▪ **William Latham** *Biogenesis*, 2:00 (excerpt) ▪ **Adem Jaffers**, *Rave Culture*, 3:00 ▪ **John Douglas**, *Underneath*, 3:30 ▪ **Chris Landreth**, *Story of Franz K*, 3:30 ▪ **Michelle Robinson**, *When I was six*, 2:30 ▪ **Matthew Brunner**, *Deathing*, 8:40 ▪ **Cheung Wai-Kwong**, *Sous l'autre ciel* ▪ **Leslie Bishko**, *Grasping for Air* ▪ **Nance Paternoster**, *Book* ▪ **Troy Innocent**, *Jawpan*, 6:00 ▪ **Javier Mariscal**, *Acuarinto*, 5:30

minneapolis college of art and design

Minneapolis College of Art and Design
2501 Stevens Avenue South
Minneapolis, Minnesota 55404 U.S.A.