



SISEA

SECOND INTERNATIONAL SYMPOSIUM ON ELECTRONIC ART

November 12 - November 16, 1990

Groningen, Holland

Final program Book of abstracts Exhibition catalogue

Rijkshogeschool Groningen (RHG)/Groningen Polytechnic
RHG Dept. of Visual Arts, Music & Architecture "Academie Minerva"
National Institute for Computer Animation/SCAN

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K E O L
I J G O R I N
R H C H G I N
S G

S E C T O R
K U N S T V A K
O P L E I D I N G E N
A C A D E M I E
M I N E R V A

SCAN

Acknowledgements

The members of the Organizing Committee wish to express their gratitude

to the following for their cooperation and support:

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and others

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Main Symposium Location:

Cultural Center De Oosterpoort

Palmslag 10 Groningen

Final program



W E L C O M E

Groningen Polytechnic (RHG), the Department of Visual Arts, Music and Architecture ("Academie Minerva") of the RHG and SCAN, the National Institute for Computer Animation would like to welcome participants to the Second International Symposium on Electronic Art.

The Symposium brings together experts on all aspects of artistic applications of electronic technology in a scientific, creative and educational forum for scientists, artists, policy makers and all other specialists in the field of the electronic arts. The five day event will offer workshops by international experts on the current state of the computer arts. Papers selected by the International Program Committee will be presented on the most recent developments in computer graphics, computer music, interactive electronic art, video art, virtual reality and so on. Special focus will be given to the integration of electronic art forms and the aesthetics of electronic art.

During 'Poster Sessions', artists will demonstrate and discuss their work in an informal setting. A wide variety of electronic art institutions and organizations will introduce themselves during the 'Institutional Presentations' sessions. During the Symposium the Inter-Society for the Electronic Arts will hold its first meeting. Other Symposium events will include an electronic art exhibition, presentations of industrial and commercial applications, evening performances and concerts, a film & video show and general events.

The Organizing Committee anticipates a stimulating and thought provoking symposium where scientists, artists and technologists can exchange expertise and ideas. We hope your attendance at the symposium gives you a broadened sense of the potential within your field. Your participation in SISEA is an integral part of its success.

Enjoy your stay in Groningen!

C.L.H.B. Verstegen (Chairman of the Board, Groningen Polytechnic)

ORGANIZING INSTITUTIONS

SISEA is Organized by

- RHG, Rijkshogeschool Groningen (Groningen Polytechnic)
- RHG Department of Visual Arts, Music & Architecture "Academie Minerva"
- SCAN, Stichting Computeranimatie (National Institute for Computer Animation)

Rijkshogeschool Groningen (RHG)

The Rijkshogeschool Groningen (Groningen Polytechnic) is the result of a merger between sixteen independent schools for Higher Professional Education which took place in 1986. The RHG has over 8000 students, 1000 staff members and provides over 45 areas of study. The RHG consists of five departments:

1. Communication and Education (a.o. Teacher Training, Library and Information Sciences)
2. Social Sciences (a.o. Social Work, Personnel Management, Child Welfare Work)
3. Health (a.o. Physical Therapy, Nursing, Speech Therapy)
4. Technology (a.o. Software Engineering & Computer Science, Electrical Engineering)
5. Visual Arts, Music and Architecture ("Academie Minerva")

Academie Minerva

Originally "Academie Minerva" was the name of a renowned art school, founded in 1798. In 1986 the Academy of Visual Arts, the Academy of Architecture and the Municipal Conservatory were united into the Department of Visual Arts, Music and Architecture, which is now the "Academie Minerva" of the Groningen Polytechnic (RHG). Minerva has, besides many more 'traditional' departments, a computer graphics department and a computer music department. The computer graphics department cooperates closely with SCAN. Minerva offers a post-graduate education, including a masters degree in computer graphics and animation.

SCAN

SCAN (Stichting Computeranimatie), the National Institute for Computer Animation, was founded in 1988 by the Groningen Polytechnic in cooperation with industry. It provides short and extended courses in high level computer graphics and computer animation. SCAN cooperates closely with the department of Visual Arts and Architecture of Academie Minerva. Students work with both low and high level equipment and use both commercial and inhouse software. The artistic use of animation software based on advanced research in physically-based modelling and robotics is one of the most interesting features of SCAN.



COMMITTEES

COMMITTEE OF RECOMMENDATION

- H.J.L. Vonhoff (Royal Commissioner)
- A.A.M.F. Staatsen (Mayor of Groningen)
- A. van der Zwan (President, World Software Group)

ORGANIZING COMMITTEE

- Wim van der Plas (Director SCAN)
- Eric Kluitenberg
- Ben Warner (Board Member SCAN, advisor)

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- A. van Hijum (Board Member, Groningen Polytechnic)
- P.G.J. Leijdekkers (Director, Department of Visual Arts, Music & Architecture "Academie Minerva", Groningen Polytechnic)
- J.H.J.M. van de Vijver (Director, Post Graduate Studies, Academie Minerva)

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- Paul Berg (NL, Computer Music Association)
- Jurgen Claus (BRD, Massachusetts Institute of Technology)
- Donna Cox (USA, SIGGRAPH)
- Charles Csurik (USA, Ohio State University)
- Michael Girard (NL, SCAN)
- Theo Hesper (NL, Foundation for Creative Computer Applications)
- Felix Hess (NL, Groningen University)
- Yoichiro Kawaguchi (Japan, Nippon Electronics College)
- John Lansdown (UK, Middlesex Poly/Computer Arts Society)
- Raymond Lauzzana (USA, Art Science & Technology Network)
- Tom Linehan (USA, Texas A&M University)
- Roger Malina (USA, Int. Society for the Arts, Science & Technology)
- Kees van Overveld (NL, Eindhoven University)
- Stephen Pope (USA, Computer Music Journal)
- Christine Schopf (Austria, Ars Electronica)

EXHIBITION COMMITTEE

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- Eric Kluitenberg
- Ben Remkes (Academie Minerva)

- Ebe Treffers (Academie Minerva)
- Gerrit Velthuis (Academie Minerva)

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- Martin Bartels (SCAN)
- Erik Bijl
- George Herfkens (Academie Minerva)
- Fokke van der Veer
- Jochem Vos (Academie Minerva)

COORDINATOR GENERAL EVENTS

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PR COORDINATOR

- Marlise Vroom (RHG)

SECRETARIAT

- Heidi van der Plas-van der Wal

GRAPHIC DESIGN

- Bas W.M. Ekkers

The Organizing Committee wishes to thank:

Tjebbe de Boer (RHG), Ton Kee (RHG), Babs Warner (SCAN), Susan Amkraut (SCAN), Robbert Bloemendaal and many others.



FINAL PROGRAM SISEA

MONDAY November 12
WORKSHOPS
Time 09.00-18.00

1. MUSIC

Monday November 12, one-day Workshop

Zack Settel: **TIMBRE AS A FUNCTION OF CONTROL SIGNAL PROCESSING**

Place: Music Conservatory, Groningen Polytechnic
For: Musicians, teachers and advanced students with some technical background.

Content: This Workshop could be called "electronic instrument design". In this workshop the main emphasis is placed on the role of dynamic parameter change (instrument behaviour) in the synthesis of "timbre", that is, the great importance of the control (MIDI) interface in electronic instruments.

Monday, November 12-Tuesday, November 13, two-day Workshop

Phil Burk: **THE USE OF HMSL TO DESIGN LIVE, INTELLIGENT INTERACTIVE COMPUTER MUSIC SOFTWARE**
Place: Music Conservatory, Groningen Polytechnic
For: Musicians, teachers and advanced students.

Content: HMSL, the Hierarchical Music Specification Language, will be described, and its use as a tool for music composition.

HMSL is an object oriented programming language designed for experimental music. It is an extension to Forth and is available on the Macintosh and Amiga. HMSL is the result of ongoing research in algorithmic composition and interactive performance. It is being used to teach computer music techniques in many colleges and universities worldwide. As part of the workshop, several compositions will be performed and analysed in detail.

Teachers: Phil Burk is from the United States. He works for Mills College and Frog Peak Music.

2. GRAPHICS

Monday, November 12-Tuesday, November 13, Two-day Workshop

Ed Ubels & Hans Roos: **LOW BUDGET COMPUTER ANIMATION**
Place: SCAN, National Institute for Computer Animation
For: Artists, animators, designers, art teachers and

advanced students. Some computing experience is desirable, but not a prerequisite. This course is meant to serve as an introduction in computer graphics and computer animation. A substantial part of the course is hands-on, using Amiga's. The Amiga and the Macintosh will be compared.

Teachers: Hans Roos & Ed Ubels both teach at Groningen Polytechnic (Academie Minerva). Both are independent artists and computer animators.

Monday, November 12-Tuesday, November 13, Two-day Workshop

Simon Biggs: **COMPUTER GRAPHICS FOR VIDEO ARTISTS**

Place: Academie Minerva, Groningen Polytechnic
For: Designers, animators, video artists, computer art teachers.

A good knowledge of video and animation is expected. Some computing experience is desirable, but not a prerequisite.

Content: This course will look at the creative application of a number of software packages on the Macintosh II platform with 32 bit broadcast video input and output. Included in the course will be 2-D image processing and animation as well as 3-D image synthesis and animation. The interface between digital and video technology will be examined, along with digital sound editing.

Teacher: Simon Biggs is Australian. He works for Groningen Polytechnic (Academie Minerva) and Middlesex Polytechnic.

Monday, November 12-Tuesday, November 13, Two-day Workshop

Susan Amkraut & Michael Girard: **SIMULATION TECHNIQUES FOR COMPUTER ANIMATION**

Place: SCAN, National Institute for Computer Animation
For: Computer animators, computer graphics educators, others interested in simulation. Some computer experience is a prerequisite. Computer graphics experience is desirable, but not mandatory.

Content: Several simulation techniques, and especially the use of physically based modelling and robotics, will be explained. The artistic application of these simulation techniques will be discussed. An introduction in several of these animation techniques will be followed by hands-on sessions on a network of Apollo workstations, using mainly in-house software.

Teachers: Susan Amkraut & Michael Girard are from the United States. They work for SCAN, the National



Institute for Computer Animation. Their film EURHYTHMY has won many of the most important international prizes for computer animation.

**TUESDAY November 13
WORKSHOPS
Time 09.00-18.00**

1. MUSIC

Tuesday: November 12, one-day Workshop
Zack Settel: OBJECT ORIENTED COMPUTER MUSIC PROGRAMMING LANGUAGES
Place: Music Conservatory, Groningen Polytechnic
For: Musicians, teachers and advanced students with some technical background.

Content: This workshop includes a basic introduction to the concepts of object oriented music programming languages. The material is presented from a musician's point of view.

Scheduling, event management and problem solving are discussed as well as score and tempo following and the control signal processing. The programs Perform and Max, both developed at IRCAM, will be featured and demonstrated. After the break, participants may apply some of the mornings theory in simple programming exercises.

Teacher: Zack Settel is American. He is an independent artist, presently working at IRCAM.

Phil Burk: THE USE OF HMSL TO DESIGN LIVE, INTELLIGENT INTERACTIVE COMPUTER MUSIC SOFTWARE
Continuation of Monday

2. GRAPHICS

Tuesday, November 13. One-day workshop

Raymond G. Lauzzana: DESIGN AND ARTIFICIAL INTELLIGENCE
Place: SCAN, National Institute for Computer Animation
For: Designers, art educators, architects, advanced students
Place: SCAN, National Institute for Computer Animation

Content: The workshop focuses on two primary technologies: Design Rule Systems and Semantic Networks. During the Design Rules portion it will be shown how rule-bases are used to characterize the design rules of particular artists and designers. The designs are abstracted into their formal properties and characterized symbolically in a design language. The nature of the designs is studied by an analysis of the grammatical rules for the language,

and the rules are implemented in terms of a shape grammar.

During the Semantic Network portion, participants are asked to incorporate their personal color vocabulary into a trans-lingual semantic network of color terminology. Participants will be able to compare color terminologies across languages. Previous work shows that color naming is closely tied to cultural experience.

Currently the network cross-translates the color terminology of 24 languages.

Teacher: Ray Lauzzana is from the United States. He currently teaches at the HKU in Holland.

Ed Ubels & Hans Roos: LOW BUDGET COMPUTER ANIMATION
Continuation of Monday

Simon Biggs: COMPUTER GRAPHICS FOR VIDEO ARTISTS
Continuation of Monday

Susan Amkraut & Michael Girard: SIMULATION TECHNIQUES FOR COMPUTER ANIMATION
Continuation of Monday

Tuesday, 18.00-19.30 hrs:

INFORMAL GET-TOGETHER in the School of Visual Arts and Architecture "Academie Minerva"



SYMPOSIUM

November 14-16

WEDNESDAY November 14

Session 1 (Plenary)

**Main Symposium Room
09.00-09.30**

Welcome by the Alderman of Culture of Groningen
Welcome by C.L.H.B. Verstegen, Chairman of the
Board of Groningen Polytechnic

09.30-09.45

Seth Shostak: ELECTRONIC CULTURE IN GRONINGEN

09.45-10.30

John Whitney Sr.: SOME COMMENTS ON THE VISIBLE
SHAPE OF TIME FOR TELEVISION AND FUTURE
MEDIA, A THEORETICAL QUEST

10.30-11.00

Coffee

Session 2 (Plenary)

Main Symposium Room

11.00-11.45

K. Hoenich: ELECTRONIC AND SOLAR ART

11.45-12.30

R. Holloway: VIRTUAL REALITY & ART

12.30-14.00

Lunch

Session 3 (Parallel): I

Main Symposium Room

14.00-15.30

Music

Ph. Burk: LIVE INTERACTIVE INTELLIGENT COMPUTER

MUSIC, NOTES ON PIECES DONE IN HMSL

G.L. Nelson: USING FRACTALS FOR INTERACTIVE
COMPOSITION

P.E. Beijls: COMPLEX DYNAMICS AND MUSICAL
CREATIVITY

G. Haus & A. Stiglitz: A SOFTWARE TOOL FOR THE
FUNCTIONAL PERFORMANCE OF MUSIC

Session 3 (Parallel): II

Parallel Room

14.00-15.30

Institutional Presentations

A. Bureaud: INTERNATIONAL DIRECTORY OF ELEC-
TRONIC ARTS / CNAT

I. Cronsioe: RAD/RAM: THE LIVING ART CENTER

E. Theofilakis: CETECH

J.P. Detev: COMPUTER MUSIC LABORATORY

S. Gorewitz: EXPERIMENTAL TV CENTER

B. Langer: ELECTRONIC MEDIA ARTS

15.30-16.00

Tea

Session 4 (Parallel)-I

Parallel Room

16.00-17.30

Aesthetics

B. Reiser & F. Stitt: RECENT ADVANCES IN ELEC-
TRONIC ART & MEDIA

D. Maxwell: THE EMPEROR'S NEW ART?

J.H. Frazer: COMPUTER: MUSE OR AMANUENSIS

S. Penny: MACHINE CULTURE

Session 4 (Parallel)-II

Main Symposium Room

16.00-17.30

Graphics, Animation, Image Processing

E. Zajec: ORPHICS: COMPUTER GRAPHICS AND THE
TEMPORAL DIMENSION OF ELECTRONIC COLOUR

K. Donoghue & Ken Knowlton: COMPUTER SIMULA-
TION OF CALLOGRAPHIC PENS & BRUSHES

C. Caldwell, T.E. Linehan & R.E. Parent: SIMULATION
AS ANIMATION

C. Giloth: FEMINIST CULTURAL LANDSCAPES

T. Robbin: QUASI CRYSTALS FOR ARCHITECTURE

18.00

OFFICIAL RECEPTION in the Provinciehuis (Coun-
tyhouse). Sponsored by the Province of Groningen.

20.15

PERFORMANCES & CONCERTS

Main Symposium Room

J. Ament: CONCERT FOR COMPUTER ORCHESTRA

Concert for ten Computers

T. Gruchy: GLITCH

Performance

Z. Settel: ESHROADE PIEPEL

Electro-Acoustic Concert with Pierre Lafaye, clarinet

S. Pope: KOMBINATION II

Computer Music

BREAK

Stelarc: EVENT FOR AMPLIFIED BODY, AUTOMATIC
ARM & THIRD HAND

Performance



M. McNabb: GALILEI (a work in progress)
Computer Music
A. Abbado: CLOUDS
Performance
E. Edmonds: VIDEO CONSTRUCT
Performance with J. Husquinet, L. Krin & G. Cabodi
(musicians)
Z. Karkowski: FOR ME & MY GODS
Computer Music Concert with Ulf Bilting & Malin
Larsson

20.15
PUBLIC LECTURE
Parallel Room

Susan Kirchman: DIGITAL PHOTOGRAPHY

THURSDAY, November 15
Session 1. (Plenary)
Main Symposium Room

9.00-10.30

S.A.R. Scrivener & S. Charles: SEARCHING PICTORIAL
DATABASES BY MEANS OF DEPICTION
P. Search: MUSEUM TECHNOLOGY: NEW LINKS TO
INTERPRETING, PRESENTING AND CREATING ART
R. Fisher: SPACE SAILS

10.30-11.00

Coffee

Session 2. (Plenary)
Main Symposium Room

11.00-11.45

B. Evans: TEMPORAL COHERENCE WITH DIGITAL
COLOUR
M. McNabb: THE COMPOSER AND ORCHESTRAL
EXPRESSION: CLOSING THE GAP

11.45-12.30

R. Dannenberg, T. Hesper, R. Lauzzana, S. Pope
(Panel): STANDARDS FOR ELECTRONIC ART

12.30-14.00

Lunch

Session 3. (Parallel): I
Main Symposium Room

14.00-15.30

Aesthetics of Electronic Art
C. Loeffler, V. Reed, F. Truck, B. Britton, A. Covey
(panel): INTERACTIVE ELECTRONIC ART
J. Claus: ART FOR THE BIOSPHERES
P. d'Agostino & J. Claus (Panel): AESTHETICS OF
ELECTRONIC ART

Session 3. (Parallel): II.
Parallel Room

14.00-15.30

Institutional Presentations

F. Stitt & B. Reiser: YLEM, ARTISTS USING SCIENCE &
TECHNOLOGY
B.M. Galeyev: PROMETHEUS
R. Fisher: VISUAL ENGINEERING LAB
A. Stiglitz: MUSIC PROCESSING AT L.I.M.
P. Sidjanin: STATE OF THE ART IN YUGOSLAVIA

15.30-16.00

Tea

Session 4. (Parallel): I
Parallel Room/Exhibition Site (ES)
16.00-17.30

Poster Sessions (Simultaneous)

16.00-16.30

1. K. Allik/R. Mulder: AMIGA COMPUTERS IN A LOW
COST INTERACTIVE INTEGRATED MEDIA NETWORK
2. J.F. Sherman: DIGITAL ROMANCE
3. J.H. Frazer: UNIVERSAL CONSTRUCTOR
(ES) N. Paterson: A SPACE

16.30-17.00

1. M. Emmer: COMPUTER GRAPHICS, MATHEMATICAL
RESEARCH & ART
2. C.B. Rubin: THE COMPUTER AND ARTISTIC PRO-
CESS: BREAKING THE CONFINES OF TRADITIONAL
MEDIA
3. R.L. Loveless & B. Marsh: SMARTER THAN DOGS, A
VIDEO DOCUMENTARY OF A PERFORMANCE WORK
(ES) D. Back: JACOB WRESTLING

17.00-17.30

1. T. Szentgyorgyi: COMPUTER ART IN HUNGARY
2. R. Fisher: COMPUTER ASSISTED ENVIRONMENTAL
SCULPTURE
3. E. Molner: COMPUTER ASSISTED MUSIC CONDUCT-
ING
(ES) D. Rokeby: DYNAMICALLY INTERACTIVE SYSTEMS

Session 4. (Parallel): II
Main Symposium Room

16.00-17.30

Institutional Presentations

S. Charles/S.A.R. Scrivener: ELECTRONIC MEDIA
LABORATORY
I. Gerard: INA/IMAGINA
E. Zajec: SYRACUSE MEDIA STUDIES
C. Schopf: ARS ELECTRONICA
G. Muhleck: CENTRE COPIE ART



20.15
FILM & VIDEO SHOW
Main Symposium Room

Sponsored by Hewlett-Packard Nederland BV

Videos by: Ohio State University, Apple Computer, Sims, Pixar, Zajec, Hiroshima University, Apollo Computer, Evans, Nappi, Waliczky, Biggs and others, plus: Imagina Selection, Stereo projection, 16 mm films by: McCormack, Abbado, Whitney, 35 mm films by: Pixar, I.L.M., Kawaguchi, Latham.

22.15
LATE NIGHT SOCIAL EVENT
Parallel Room

Sponsored by Societe Ricard

FRIDAY
November 16

Session 1. (Plenary)
Main Symposium Room

09.00-10.30

Electronic Art and Society
P. Brown: COMMUNION & CARGO CULTS
S. Penny: THE INTELLIGENT MACHINE AS ANTI-CHRIST, A BRIEF HISTORY OF ANTHROPOMORPHISM IN ART & SCIENCE

10.30-11.00

Coffee

Session 2 (Parallel): I
Main Symposium Room
11.00-12.00

Institutional Presentations

R. Malina: ISAST
C. Giloth: SIGGRAPH
R. Dannenberg: COMPUTER MUSIC ASSOCIATION
D. Worrall: AUSTRALIAN CENTER FOR ART & TECHNOLOGY
C. Loeffler: ARTCOM

12.00-12.30

Mohammed Aziz Chafchaoui: ESTHETICS OF ISLAMIC ART; POTENTIALS OF THE SYNERGY SCIENCE/ART/SPIRITUALITY

Session 2 (Parallel): II
Parallel Room/Free Screening Room (FSR)

11.00-12.30

Poster Sessions (Simultaneous)

11.00-11.30

1. C. Harris (presented by S. Pope): IN DELICATE BALANCE
2. K. Gray: THE EVOLUTION OF THE ELECTRO SCULPTURE
3. P. v. Berkel: REFLECTION OF SOUND AND IMAGES

11.30-12.00

1. P. Search: MUSEUM TECHNOLOGY: LINKS TO CRITICAL PROBLEMS IN HYPERMEDIA COMPUTING
2. B.M. Galejev: METHODS OF MUSIC VISUALIZATION
3. (II FSR) E.A. Edmonds: THE DEVELOPMENT OF THE VIDEO CONSTRUCT

12.00-12.30

1. J. Whitney Sr: DEMONSTRATION
2. S. Penny: CECI N'EST PAS UN OISEAU
3. J. Haveman: ART ON CD ROMS; THE CUTTING EDGE

12.30-14.00

Lunch

12.45-13.45

LUNCH CONCERT Conservatory

Session 3 (Plenary)
Main Symposium Room
14.00-14.45

FIRST PLENARY MEETING OF THE INTER-SOCIETY FOR THE ELECTRONIC ARTS Panel: Virginia Barrat, Paul Brown, Isabelle Girard, Theo Hesper, Raymond Lauzzana, Roger Malina, Wim van der Plas, Christine Schopf. Chair: Seth Shostak. Including: P. Brown: SIGGRAPH 92 PROPOSAL, V. Barratt: THE THIRD INTERNATIONAL SYMPOSIUM ON ELECTRONIC ART

Australian Presentation I

14.45-15.30

Stelarc: PROSTHETICS, ROBOTICS AND REMOTE EXISTENCE: POST EVOLUTIONARY STRATEGIES

15.30-16.00

Tea



Session 4 (Plenary)
Main Symposium Room

Australian Presentation II
16.00-16.45

S. Pryor: THINKING OF ONESELF AS A COMPUTER
L. Wallace: AUSTRALIA AND ELECTRONIC ART

16.45-17.00

M. Girard: CLOSING REMARKS

20.15
PUBLIC DEBATE
Main Symposium Room

In Cooperation with Studium Generale

Richard Holloway & Copper Giloth: ART MEETS
SCIENCE (Chair: Seth Shostak)



EXHIBITION

An Electronic Art exhibition is held in the central hall of the Oosterpoort from Wednesday, November 14 through Friday, November 16. Opening hours: 9 a.m. - 5 p.m. and 7 p.m. - 11 p.m.

Part of the exhibition will be a video program at the 'Video Pavillion' (by the famous architect Tschumi) on the Hereplein.

Opening hours: Sunday November 4 - Friday November 16: 12 - 5 p.m., Thursdays 12 - 9 p.m., closed on Mondays. This event is sponsored by PTT-Telecom and Sony Nederland.

Downstairs at the exhibition site, there is a Free Screening Room. Video's and slides that were not selected for the Sisea exhibition or film & video show can be viewed there, as well as tapes or slides brought by participants.

On the Grote Markt in the City Center, the AVTEL electronic bulletin board (on the roof adjacent to the Doelen hotel) will be used part time for electronic art. Symposium participants can make a contribution. Information from the registration desk.

SPECIAL EVENTS

Saturday, November 10, 21.00 hours: Try-out Performance by Stelarc in the Video Pavillion on the Hereplein.

Sunday November 11, every two hours: SISEA broadcast on Groningen Art Channel (Cable TV).

Tuesday November 13, 18.00-19.30 hours: Informal get-together in Academy Minerva.

Wednesday November 14, 18.00-19.00 hours: Official Reception at the County House (Provinciehuis), sponsored by the Province of Groningen.

Wednesday November 14, 20.15 hours: Public Lecture on Digital Photography by Susan Kirschman Parallel Room. In cooperation with Noorderlicht photo exhibition.

Thursday November 15, 22.15 hours (after the Film & Video show): Late Night Social Event, sponsored by Societe Ricard. Parallel Room.

Friday November 16, 12.45-13.45 hours: ECO's Electronic Music Lunch, by the Electronic Composition Group of the Music Department, Academie Minerva. Limited number of free tickets available from the registration desk. Lunch will be served.

Friday November 16, 20.15 hours: Public Debate: Art Meets Science. With Richard Holloway, Copper Giloth and Seth Shostak. In co-operation with Studium Generale. Main Symposium Room.

GENERAL INFORMATION

Addresses

The Symposium will be held in Cultural Center the Oosterpoort, Palmslag 10, Groningen; telephone (0)50-182 333.

The Workshops will take place in the Music Conservatory, adjacent to the Oosterpoort, Veemarktstraat 76 and in SCAN, the National Institute for Computer Animation, Westerhavenstraat 11-13, near the Groningen Museum and Academie Minerva Ged. Zuiderdiep 158. Telephone Conservatory en Minerva (0)50-185454, SCAN (0)50-138343.

Registration Area

Registration for the Symposium will be at the SISEA desk in the Oosterpoort from 16.00 to 20.00 hrs on Tuesday, November 13 and from 08.00 hrs each day of the Symposium. Participants can receive mail during the Symposium addressed to SISEA, Westerhavenstraat 13, 9718 AJ Groningen, Holland.

During the Symposium you can be reached by telephone, fax or E-mail. The Email address is SCAN@HGRRUG5 (bitnet). Sender must clearly indicate the addressee's name as 'Subject'. Phone: (31-50) 121388, fax, (31-50) 180614

Catering

Lunches are included in the registration fee (for the Symposium only, not for the Workshops). Lunches will be served in the

Conference Center. Coffee and tea will be provided during the breaks. A bar is located in the Conference Center and there are many restaurants, cafes and bars in the center of Groningen, within walking distance from the Oosterpoort.

Symposium Language

The official language of the Symposium is English.



Book of abstracts



ELECTRONIC ART: WHY GRONINGEN?

Shostak, Seth

Film maker and writer

Mountain View, CA

USA

In this brief presentation, the author will give the seldom-before-told story of Groningen's development of both software and prominence in the field of computer graphics. Dr. Shostak will employ his unrivaled collection of soporific slides to show how the present SISEA symposium, and its sponsor, SCAN, trace their existence to a Dutch need to explain the expanding universe to the man in the street. It is a story of some drama, and considerable humor, and might even prove instructive to those who would like to see expanded interest in the topics of this symposium in their own home towns.

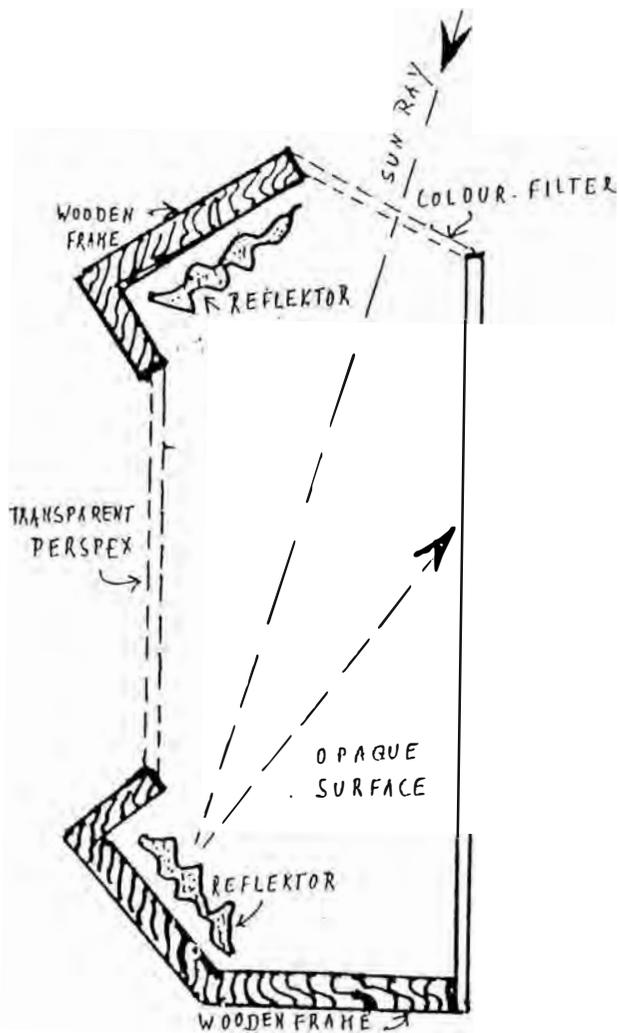
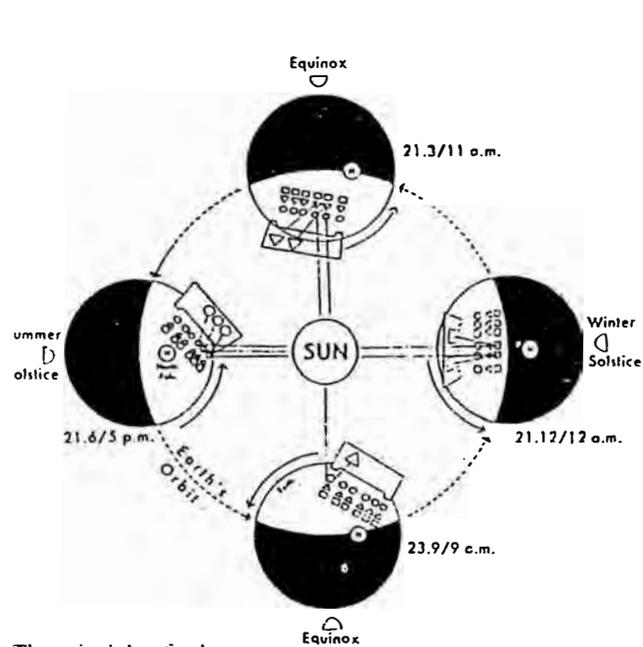
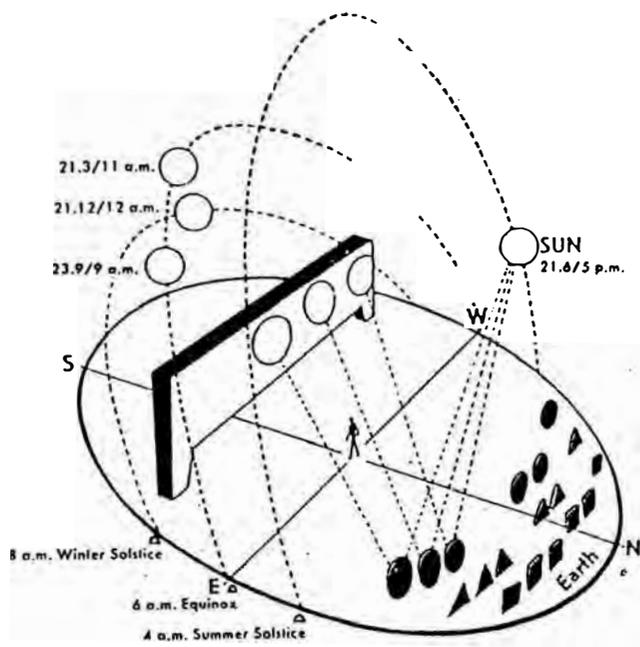


Diagram of the vertical cross section of the Robot Projector for 'Light Symphony, No. 1'.



The principle of robot art



The cosmic projector.

ELECTRONIC AND SOLAR ART.

Hoenich, Paul Konrad.

Faculty of Architecture -Technion -Israel Institute of Technology,
Haifa,
ISRAEL.

Solar Art has Robot and Manual techniques.

All use reflectors -reflecting sculptures - for the form of the sun-projections and color-filters -transparent paintings -for the colors.

There are 3 robot-techniques:-

- 1) A cosmic projector - rows of fixed sun-reflectors, moved by our planet relative to the sun, projects kinetic pictures on outside walls.
The constructor plans the projections for six months, from solstice to solstice.
- 2) Sun-robots which create sun-pictures:-
They use earth-rotation combined with wind-energy for the movement of their reflectors. When three or more reflectors move independently from one another, they will forever produce new combinations and create new sun-projections.
- 3) The third robot technique, called "Lightsymphony No.1" -the name of its prototype- looks like a framed picture.
Inside the frame are reflectors and color-filters.
The prototype is a functional self-portrait of the artist, who implanted his art into the robot - construction of an optical brain.
If a visitor plays with the robot by moving a mirror and reflecting sunlight against the frame, the robot uses him as a source of energy and creates an unlimited number of kinetic pictures, which represent the art of the constructor.
This robot functions with artificial light too.

Two manual techniques:-

- 1) Static Solar Art by manual arrangement of reflectors and photography of the sun-projections.
Countless variations can be achieved in the shortest time by moving the reflectors. - Design with light.-
- 2) Kinetic sun-projections by manual manipulation of reflectors and filters.
Improvisations with sunrays like a virtuoso with his instrument.
Combination of kinetic sun-art with ballet etc.

Conclusion:-

Artists should not be bound to a single way of creativity.
Solar Art has a similar philosophic background as Electronic Art.
It could be a useful alternative.

SISEA ABSTRACTS

TIME TRAVEL, A JOURNEY INTO THE PAST

Hoenich, P.K.

Independant Artist

Haifa

ISRAEL

Sun pictures by P.K. Hoenich, Polysonor (electronic)
Music by Nikolaus Bresgen.

This concert is visual program-music and has the following contents:

Once upon a time there was a painter who painted with sunrays. Nobody understood why he did this, and he did not understand his time. It was the time of the atomic bombs. He asked the Sungod to send him and his girl-friend into the past. The God fulfilled his wish. He sent the pair to past cultures and finally into the far dawn of time, where no humans existed as yet. That is how Gods are - somewhat over-generous - .

Better be cautious, when requesting something from them!

The pictures are static sunprojections. Some of them are abstract, others are real relics of the past, photographed by P.K. Hoenich during a journey round the world - in Cambodia, Mexico, Easter Island and Israel - and combined with sunprojections. The photos needed for ancient times - when no humans existed as yet - were made in Africa.

The polysonor music was created by Nikolaus Bresgen, who played many instruments, one after the other, and united them into an orchestra by electronic techniques.

VIRTUAL REALITY AND ART

Holloway, Richard; Department of Computer Science,
University of North Carolina at Chapel Hill

Chapel Hill, North Carolina, USA

"Virtual Reality" is a field that has attracted much interest from people of many different disciplines. This is not surprising, since there are so many applications for virtual reality, from architectural building walk-throughs, medical applications and scientific visualization, to performance art.

The emphasis at the University of North Carolina at Chapel Hill (USA) is on improving virtual reality technology and using it to solve real problems. Some of the current applications of virtual reality at UNC are: architectural building walk-through, radiation treatment planning, molecular docking, and medical "X-Ray vision".

This paper gives an overview of virtual reality techniques and highlights the relevant work in progress and recent developments at the University of North Carolina at Chapel Hill, as well as discussing this work's relevance to art.

Live Interactive Intelligent Computer Music: Notes on Pieces Done in HMSL

Larry Polansky

Assistant Professor of Music, Dartmouth College, Hanover, NH 03755

Guest Editor, Leonardo Music Journal

email: larry.polansky@mac.dartmouth.edu

This paper concerns several pieces composed and performed by the author between 1984-90, in the context of the computer music language HMSL, a widely used environment which supports experimentation in musical intelligences, live interactive programmable stimulus-response environments, and redefinitions of approaches to musical form. The specific pieces described include 1) B'rey'sheet (for voice and computer); 2) Simple Actions; 3) 17 Simple Melodies of the Same Length (for melodic instrumentalist and computer); 4) Cocks Crow, Dogs Bark... (in collaboration with Melody Sumner and John Bischoff); and the most recent, 5) Three Studies (for instrumentalist and computer). Each of these works explores a different form of interaction with the system, and each focusses on different problems in the performance of interactive intelligent computer music: dynamic timbre control, computer-aided decision making processes, and performer interaction. Ideas for further works are discussed, with particular attention placed on the development of programmable DSP technology under the HMSL platform, and the integration of timbral processes with larger scale formal ones.

USING FRACTALS FOR INTERACTIVE COMPOSITION

Nelson, Gary Lee
TIMARA Program, Conservatory of Music
Oberlin, OH 44074 USA
(216) 775-8223
FNELSON@OBERLIN.EDU

This paper will describe fractal techniques used in the composition of four recent pieces:

FRACTAL MOUNTAINS (1988)

Scored for MIDI Horn, Macintosh computer, and digital synthesizers. This piece uses an algorithm for recursive subdivision that maps the graphic image of a mountain range on the horizon into pitch, time, and timbre. The MIDI wind controller paints the coarse features (peaks and valleys) and the Macintosh executes an algorithm to generate a complex musical texture. Aspects of dynamics, phrasing, and pace are influenced in real time by the MIDI Horn soloist.

REFRACTIONS (1989)

Scored for a quartet of Yamaha WX7 wind controllers, Macintosh computer, and digital synthesizers. The quartet score was composed algorithmically using an iterated function system (IFS) written in APL. Three dimensional graphical objects were transformed by scaling, translation, and rotation and mapped into time, pitch, and amplitude. The resulting structures were converted to MIDI files, imported to Finale, and printed.

During the performance the MIDI outputs of the four soloists are monitored by the Macintosh. Using complex dynamics, a real time algorithm continuously transforms the input to produce an "orchestral" accompaniment. The precise content of the accompaniment as well as many aspects of interpretation are determined by initial conditions caused by the solo performers.

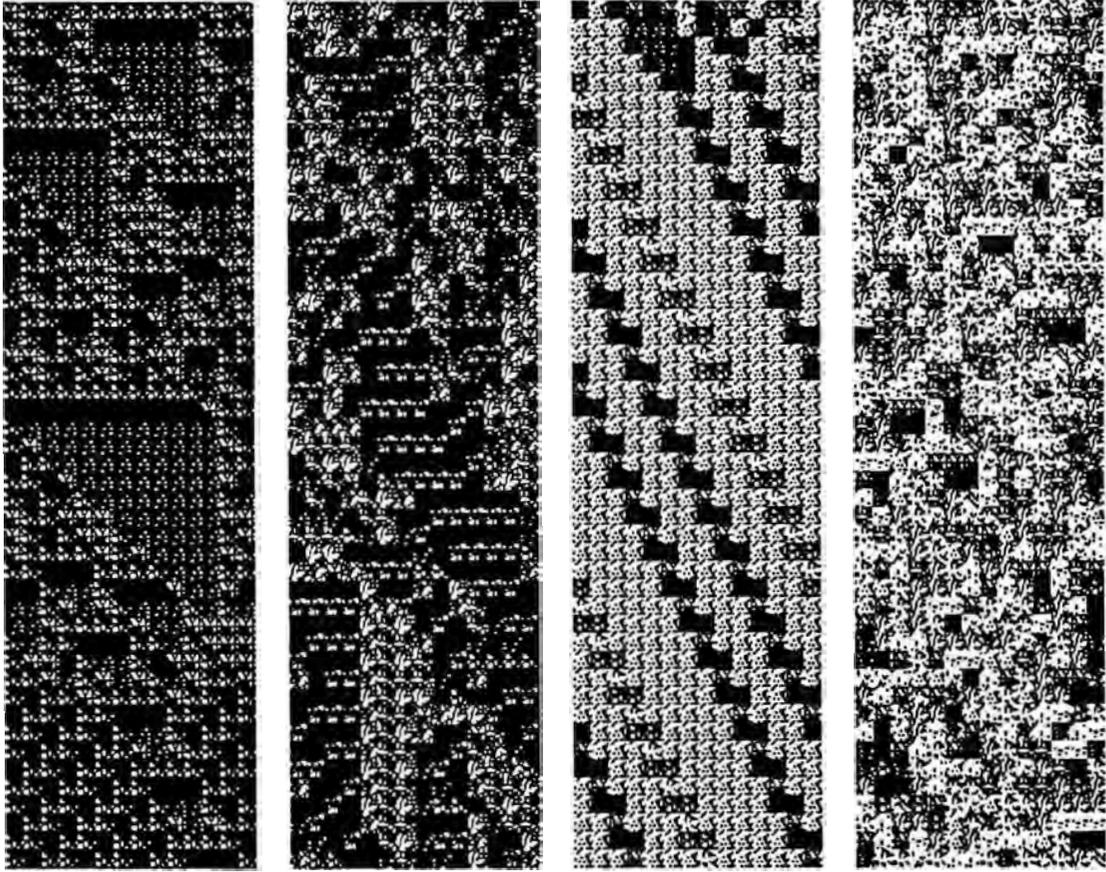
BENEDICTUS (1990)

Scored for MIDI violin, Macintosh computer, and digital synthesizers. In this work, rewriting systems are used to create a sense of continuous variation and musical development. A musical grammar is expressed as a generating string of characters and a set of replacement rules. Applying the replacement rules recursively through several generations results in a character string that can be mapped into musical structures. A real time algorithm performs the replacement based on generating strings taken from the violin's MIDI signal.

HOPEFUL MONSTERS (1990)

Scored for an ensemble of 36 wind instruments. In this work musical texture, rhythm and melodic contour were generated through a recursive replacement algorithm applied to "webs." Webs are graphical objects that resemble threads laced between nails. The large scale form of the piece was sketched with MacDraw. The MacDraw objects were interpreted with a program of my own design written in APL. The APL program created a MIDI file that was imported to Finale for score and parts.

My presentation will include a description of the composition algorithms with musical examples on cassette. Particular attention will be given to mapping techniques for changing numeric data into musical parameters.



Four examples of intricate patterns as output by a one-dimensional, 16 cell wide cellular automaton. Values proceed in time according to the consistent application of the same neighborhood rule for all cells simultaneously. Time runs from top to bottom.

COMPLEX DYNAMICS AND MUSICAL CREATIVITY

Beyls, Peter Evarist

Expanded Media Studios

Brussels

BELGIUM

ABSTRACT

Traditional channels for introducing intelligence in computer music systems are firmly rooted in the knowledge-based approach; methods and computational strategies borrowed from the field of artificial intelligence. Expert systems for composition and pattern-directed inference systems for real-time man-machine improvisation are exemplary. In general, the aim is to introduce independent creative decision making through computer simulation of human creativity. Impressive statements have been produced along these lines, in music as well as rule-based computer graphics. Two observations have led to the consideration of a totally different method. First, expert systems become problematic if situations occur that were not anticipated by the programmer and sooner or later, the programmer is facing a complexity barrier. Second, appreciation of the pattern making potential of nature led to the study of concepts like self-organization. Complex dynamical systems are an alternative to the constructivist approach in composition, i.e. the critical assembly of architectures of time according to some explicit scenario. Complex dynamical systems, on the other hand, consist of many elements interacting according to very simple laws but giving rise to surprisingly complex overall behaviour. Composition becomes experimenting with attractors -- instead of designing a rule-base -- as well as the conception of tools that allow the topology of the composer to interact with the system's internal activity. The idea is to critically push the system out of equilibrium using tactile motor control as to explore the various degrees of freedom of a given system. The implicit behaviour is then mapped to the musical problem domain. Improvisation becomes navigation in a hypothetical world of which the composer is both inventor and explorer. Examples of strange and intricate patterns, both in space and time, are found in physics, biochemistry, fluid dynamics, ecology and nonlinear mathematics. We have implemented and evaluated various models for spontaneous pattern formation, including one-dimensional cellular automata, direct computer simulation of chemical instabilities as witnessed in the BZ- reaction and a spatial model exploring equilibrium behaviour in a society of interacting agents moving in 2D space. The present paper outlines a connectionist-like model, a regular structure of agents engaged in local interaction, using forces of activation and inhibition between neighboring agents. Randomness/determinism and chance/necessity seem at the heart of creativity and happen to be central to the music of our time. We propose to view emergent properties from initial random configurations as a subtle alternative for both constraint-based, reductionist handling of randomness as well as rule-based composition by way of some generative grammar; complex dynamics as a creative, generative principle and a channel toward higher levels of man-machine interaction.

A SOFTWARE TOOL FOR THE FUNCTIONAL PERFORMANCE OF MUSIC

Haus, Goffredo; Stiglitz, Alberto
LIM - Laboratorio di Informatica Musicale
Dipartimento di Scienze dell'Informazione
Università degli Studi
Milano
ITALY

Music performance is traditionally made up by sequences of events (notes and chords, by example) as the basic objects. In this paper we show how music can be performed at a more abstract level, in which basic music objects are patterns of musical events (i.e. chunks of score).

We have designed, implemented and experimented *FP* (Functional Performer), a software tool that allows the real-time processing of music patterns by means of music functions (e.g. tonal and modal transposition, specular inversion, juxtaposition, superimposition, time shrinking, etc.); functions are activated by the ASCII keyboard keys and are either deterministic or non-deterministic. Patterns obtained by functions may be arguments for other functions during the current performance. Music is generated as MIDI data and real-time executed by MIDI devices which are controlled by *FP*.

Therefore, *FP* is a tool for the performing of music structures and their processing; the executed score is depending on the music patterns previously defined (music objects) and gestural acts we do during performance (music functions). The same sequence of gestural acts may give different results with respect to music patterns; particularly, if we only use the subset of linear functions, we have a kind of music which is consistent with the music patterns: if we define serial patterns we get serial music, if we define modal patterns we get modal music. Otherwise, we can use non-linear functions which modify the syntactic characteristics of the music patterns.

At present, the first version of *FP* is completed and is usually experimented in the frame of the L.I.M. concerts; it runs on MSX computers. A second version is under development on the Macintosh II family of computers; it has many improvements on graphics, ergonomics, efficiency and functionalities and can import/export Standard MIDI File scores.

INTERNATIONAL DIRECTORY OF ELECTRONIC ARTS - ART AND TECHNOLOGY - 1990/1991
Bureaud, Annick
Kanal Publisher
Paris
FRANCE

A DIRECTORY OF "ELECTRONIC ARTS"

Dealing mainly with organizations of creation and display and artists working in the field of electronic arts, this directory is the first specialized reference book concerning these art works.

Artistic field :

The artistic field includes : computer graphics and animation ; video ; holography ; sound/music ; computer art ; computer writing ; communication, network ; space art, sky art ; sound poetry ; performing art ; multi media.

The organizations :

All kind of organizations showing or dealing with electronic arts and not only traditionnal cultural institutions. That means : museums, galleries, art centers, scientific centers, festivals, trade fairs, training centers, non-profit organizations and foundations, firms, specialized or not. These organizations may be open to a large public or only to professionnals.

AN INTERNATIONAL DIRECTORY

Both in English and French, this directory includes 2 000 addresses in more than 30 countries all over the world.

KANAL

Since 1984 the French art monthly Kanal Magazine supports contemporary arts and culture. Multi-disciplinary, Kanal is open to fine arts but also to literature or music. It was the first in France to create an electronic arts section.

The Guide des Arts Contemporains en France (Contemporary Fine Arts in France) started a collection which now goes on with the IDEA.

C.N.A.T. : CENTRE NATIONAL ART ET TECHNOLOGIE - REIMS
(NATIONAL CENTER FOR ART AND TECHNOLOGY)

Bureau, Annick

Consultant
Paris
FRANCE

Created in 1987 the CNAT is the only permanent, multidisciplinary cultural center dedicated to art and technology in France.

AIMS

Promote the creation through exhibitions, performances, lectures, etc.
Propose to the public the wider range of creations and artworks, wether forms it may take, in the very contemporary artforms or in an historical approach.

SELECTION FROM THE PAST PROGRAMS

- "Techniscenie" (Light-music-images show) on the Reims cathedral every summer.
- "Automnales", an open-air show every year for the autumn night. During the '89 Automnales, the "Luchrone", a permanent monumental light sculpture has been inaugurated.
- R.E.T.V. Rencontres Européennes de Télévision (European Meeting on TV) every year.

SELECTION FROM THE 90/91 PROGRAM

- Automnales '90 : Sky art performance - Otto Piene - CAVS/MIT
- "Artists and the light", a major exhibition gathering during 12 weeks artists from the world over.
- "Ville invisible" (Invisible city), a multi media show by K.Danse (France) and l'Ecran Humain (Canada).
- "Semaine du son" (Sound week, exact title to be decided) around June 21st : electronic and new music, sounds experiments.

PROJECTS

"Jardin du Futur" (Garden of the future). The park where the CNAT facilities are located will become part of the whole artistic project with temporary and permanent sculptures and installations, outdoor performances, etc.

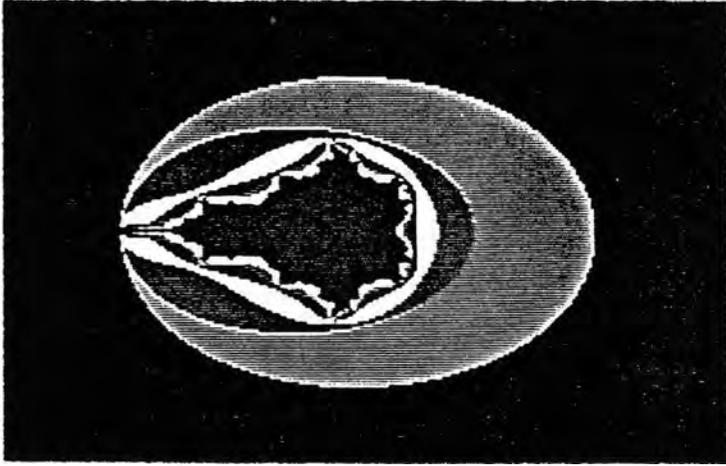
FACILITIES

At the beginning of '91, the CNAT will open its new facilities, two buildings from the 19th century which have been renewed and equiped with all the modern technics :

- A Horse riding place : space for exhibitions or concerts and performances hall with 600 seats.
- A Circus with 1300 seats mainly for shows and performances but also available for installations and small exhibitions.

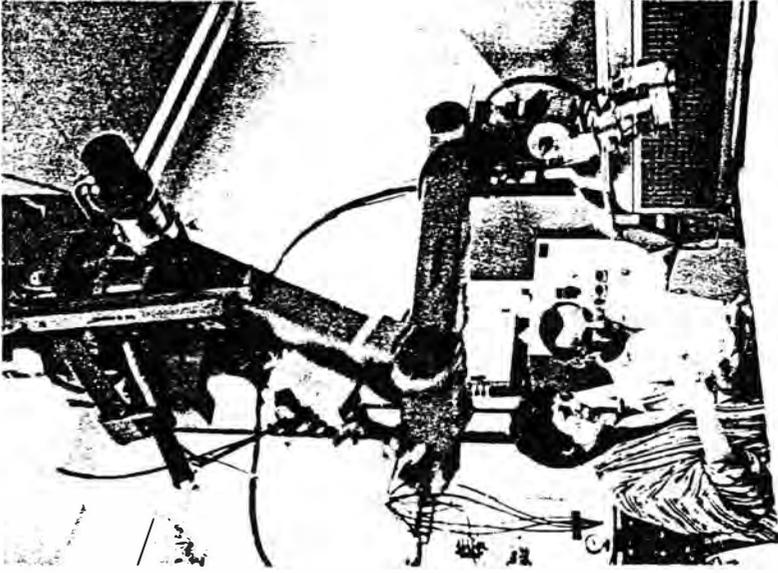


"robot drawing" ink on paper 80x100 cm



"gate to Chaos ?"

color reproduction 1350x1900 cm



RAD/RAM

production plant at Bogesunds, Sweden.

Cronsjoe, Igor

Living Art Center Gothenburg SWEDEN

CONTINUOUS DEVELOPMENT OF ART AND DECORATIVE PRODUCTS BASED ON REAL-TIME COMPUTING AND ROBOTICS

After the first year with my PC and a CAD program I wrote:
- We are all on the way into computer age. Certainly in the field of Design, but also on pure artistic base. It is obvious that we as artists will face new and exiting sources to manipulate color, shape and patterns to replace the traditional way of production. In this perspective I am thinking of a methods, based on natural rules for variation. As an artist and in my design work I will form a technique that I call Random Aided Design. -

On these words RAD/RAM was registered as a trade mark in 1982. The vision of a new era in art and industrial design. The key factors would be endless patterns in a direct process to make any single part of the product an original work, an artifact. The first work-station for my experiments was set up in 1985 supported by ASEA Robotics. I did my first "robot drawings" though it was a static system allowing no irregular interrupts. The lack of flexibility in automation equipment made me start on my own.

From the intuitive state of knowledge I started to write my own software and went through all kinds of experiments to simulate randomly produced patterns and I discovered the world of Artificial Intelligence and Kaos in the literature. I was convinced that the complex structures I was looking for had to be a combination of randomly generated values in a well defined system. To meet with the fractal geometry was a great inspiration and led to a separate work of pictures that took half a year of computing and painting but I was more interested in the process than the results. I had to invent a more vivid structure and build my own robot for a real output.

After five years of research and experiments the first production plant was established. With help from computer expert Oskar Andler we delivered the first industrial robot, rebuilt to design for a textile producer, Bogesunds in Ulricehamn, Sweden. The endless patterns on fabrics for the contract market became a success and this year prompts for a great expansion. The work with RAD/RAM is now updated with the latest hardware for servo control and writing the software has become the art itself. From a strict system philosophy via AI, CASE and Fuzzy logics my base today is an interactive system with the artist involved throughout the whole process. Instead of Artificial Intelligence in art I would rather call it Intelligent Artefaction.

In 1989 a new and inspiring location was opened, Living Art Center. To the center I welcome various artists or technicians to encounter the RAD/RAM philosophy. The first result was the invention of The Art Recorder, a rotating wall for overlay painting with an interactive system, to study complex visual structures, living design and paradoxical ideas.

THEOFILAKIS, ELIE
Universite Paris Dauphine
Paris
FRANCE

What we at CETECH want is to bring people from various disciplines (artists, businessmen, designers, engineers, scientists, architects, builders...) and different countries together and enable them to reach critical mass.

We believe this involves a tripartite approach:

1. Understanding each others disciplines.

In todays modern world, the only way in which a single body is in a position to attempt to know even a fraction of the world around us is to group together people whose skills complement each others.

2. Working together.

We want to be able to leap over the great divide which has traditionally separated art, science and industry. Whereas, in the past, great painters, inventors and scientists worked largely on their own, today we must adopt a multidisciplinary approach if we are to progress.

3. Creating a new scheme of events.

We organize symposiums around the world:

-A series of conferences entitled: convergence of Art, Science and Enterprise held in Berlin (November 1988) and Paris (November 1989) Between the 22nd and the 25th of November, CETECH will be holding the third conference in Inverness (Scotland) on the following subject: Enriching the artificial environment.

-In 1991, we are organizing an international symposium on the interface between art and technology. This will be held at the recently built Arche de la Defense in Paris new business district.

COMPUSER* - Generative musical expert system for music tutoring,
algorithmic and interactive compositions.
an IDEA VIEW KNOWLEDGE or.. a MEES
Detev, Jordan. Computer music. Bulgarian State Conservatoire.
Sofia, Bulgaria.

" COMPUSER " concentrates all my researches, experiments and works. It consists of original elements as: (1). Psychoacoustic Model. Via an input of combinations of variables, actions and sequences, universal or individual understandings on all psychoacoustic reflexes provoked by musical phenomena are being produced. Consequently they are being interpreted by an original basic generative hypothesis(2) on the basis of which many generative technologies are elaborated by accumulating different well known composition techniques. As a result we have a musical composition with certain artistic qualities in the given style, genre, musical form etc.(3). Basic editor for creating/filling the knowledge base through the logical knots: dialogue, procedural, terminal, logical. By combining their functional possibilities, a musical semantic network can be described or enlarged. This network can contain all aspects of musical knowledge on a high logical /non programming/ level. Arcs connect the created knots and play the role of an operation conductor in the network. All described proces is mentained automatically. The whole system is interpreted by many levels of interaction(4) which determine its different states: automatic, selective, direct, fulli interactive and analitic.

The command menu includes: - Basic interactive graphic-musical system - printing, adding voice, sol-faing, editing, interactive performance of generated or external musical scores.

- Presentation musical knowledge by 8 interacting aspects determining the musical system, instrumentation, texture constructing, style, genre, psychoacoustic characteristics and musical form of any musical model.

- Compuser with the generative technologies and possibilities for direct composing.

- Basic editor - creating, editing, deleting of logical knoys, same for the help information and statistics on the current state of the system.

The system disposes of a real musical communication.

" COMPUSER " can be utilized as an alternative form of education on all levels and even in the free artistic practics, I hope.

* - COMPUSER = Composer & Computer

EXPERIMENTAL TELEVISION CENTER
Gorewitz, Shalom
Artist/Representative
UNITED STATES

Sitting in the Experimental Television Center loft studio in Owego, New York, surrounded by vibrating monitors, pulsing LEDs, digital potentiometers. Outside the window, the river flows wide and deep, its movement barely perceptible; and outside the other window, the main street of this quaint, mountain village is quiet now, at night. I play the images through the sequencers, slightly realigning the start points. As they begin to weave I tune the voltage controls, breathing their frequency and intensity, until the ebb and flow of color and light match my own patterns of inhale-exhale.

Suddenly a bat appears and swoops toward a screen, almost crashes, blinded by the unnatural light. It swirls high and low around me. I know it's shrieking, my unconscious feels what my ears can't hear. It's joined by another, I drown the loft with lights; they disappear back into the wall.

I'm making a tape called "Crazy Dog." The images were recorded without looking through the camera, now these analog and digital processing systems are free to collage and abstract them further. I drive the decks and software, shift gears, steer loosely to allow accidents. This is a tape created after visiting Auschwitz; a hysterical wail about destruction and despair. I turn off the lights, but the panic remains.

Through anecdotes and observations I will discuss the history, theory, and operational procedures of the Experimental Television Center, showing how different artists fuse concept and process using the unique prototype, hybrid, and conventional systems available there. The presentation will be accompanied by examples from tapes and slides showing the various imaging instruments.



"DANCER"

neon light, glass, micro processor, infrared sensor

RECENT ADVANCES IN ELECTRONIC ART AND MEDIA

Reiser, Beverly

President

Ylem / Artists Using Science & Technology

Oakland, California

USA

Stitt, Fred,

Director

San Francisco Institute of Architecture

San Francisco, California

USA

(415) 254-9397

New art media are increasingly responsive, interactive, and multi-sensory in ways that approximate human sensory / perceptual behavior.

Sensory apparatus have been incorporated in some art works to respond to the viewer's behavior. Some works include sensory apparatus that detect and react to movements of the viewer, such as eye movements and even brain wave patterns.

Examples include:

- Interactive kinetic works that react to human body motion and dance.
- Hypermedia poetry that responds to the participant's tangential choices.
- Music and sound sculpture that responds to listener brain states.
- Virtual reality via head-mounted display and data glove, involving even greater interaction of participant with the display media -- a virtual merging of person and media.
- Interactive and responsive intelligent environments including buildings, cities, and biosphere habitats.

Cybermedia, as we apply the term, involves a progression towards replication of the human nervous system in art media. For example, this progression is seen in the work of:

- Alan Rath, video sculptures
- Milton Komisar's, computer-assisted light sculpture
- Rod Wilmot, Hyper-Poetry
- Margo Apostolos, choreographer with robots
- Beverly Reiser, interactive, multi-media installations
- Hans Christian Lechewski, architect, environmental holograms
- Ed Tannenbaum, interactive video environment
- Ken Sakamura, architect of intelligent, interactive habitats
- Jaron Lanier, pioneer in Virtual Reality

Examples of the extended possibilities of future Cybermedia include:

- Steven Soreff's extrapolations of future art forms and events
- Three-dimensional virtual worlds born of Kawaguchi's algorithmic dreamscapes
- Multi-dimensional extensions of fractal and cellular automata
- Large scale synthetic environments created by molecular engineering
- Interactive video that responds to human body states and subconscious cues of the viewer.

THE EMPEROR'S NEW ART?

Maxwell, Delle
Independant Artist
Princeton, New Jersey
USA

Premature over-promotion of any and all "artwork" created with computers has caused the critical establishment to draw parallels with the tale of "The Emperor's New Clothes". Simultaneously, computer artists accuse the art critical establishment of being uninformed, myopic, and hopelessly out of touch with the new media concerns. Artists disdain the oft-exhibited science fiction grotesqueries masquerading as art: bad critical reception is blamed on the inclusion of this nerd aesthetic in their art shows. On the other hand, some more technically-minded factions also wonder when computer artists will actually learn to program, or produce something besides canned paint system imagery and indecipherable, bad videotapes. Such squabbling and finger-pointing from one group to the next is not the way to correct the problem.

Many of the standards by which we have evaluated computer art have evolved outside of the "high art" community. Yet the standards in our own computer graphics infrastructure tend to be much lower. Often the concepts of science and tools of technology are merely appropriated and exhibited as art without any authentic artistic transformation or social context. Work, when it refers to contemporary art world trends, often does so as a form of commentary rather than of genuine individual expression. Without true understanding of either art or science and technology, this work can hardly help being superficial.

We need to fairly evaluate work using standards as high as those by which the rest of the arts are judged. We need to extend beyond the isolation of our small community and address broader issues. Most importantly, we need to take advantage of the uniqueness of computing, and push those properties to their extreme limits. Only as these issues are addressed and resolved will computer art gain in significance and authenticity.

COMPUTER - MUSE OR AMANUENSIS

Frazer, John H

Department of Design in Industry, Faculty of Art & Design, University of Ulster
Belfast
Northern Ireland

Until recently most computer systems were only graphic recording and output devices with the screen or plotter replacing the artists hand wielding a pencil or brush. This is no more than the role of amanuensis (derived from the Latin manus - hand, thus meaning to take down dictation by hand). The computer may have added something new to this process, but something very important was lost in the process and that is the reciprocity between hand and brain. Art is not an entirely cerebral process - much creativity occurs in the doing. Possibly the key is the reciprocity between the two, between the thinking and the doing.

The American architect Michael Graves for example talks of the 'intrinsic reciprocity of mind and act'. Movement is essential to learning perception.. 'the hand moves the brain engages, the brain engages the hand moves'. The intimate one to one relationship between a craftsman and his workpiece was lost with the industrial revolution. Perhaps we are now in danger of losing the one to one relationship between an artist and his work?

On the other hand developments in the direct computer control of lathes and milling machine has allowed a new form of direct relationship between designer and made object... the reemergence of a new form of electronic craftsman. Perhaps developments in artificial intelligence will allow a new form of relationship to develop between the artist and electronic media... the electronic muse.

This paper speculates on the nature of the electronic muse, and proposes alternative models of the creative process possibly more appropriate to electronic media and raises questions about the possibility of an artificial intelligence having a concept of aesthetics.

MACHINE CULTURE

Penny, Simon

Electronic Intermedia program, Dept of Art, University of Florida.

Gainesville.

USA.

The relationship between the technology of a culture, and its 'world view' are symbiotically interrelated. This relationship is examined with respect to industrial and post industrial (electronic) western culture, particular attention being paid to the role of artists. A brief history of the position of 'art' with respect to 'science' and 'technics' is drawn. The role of art practice as political act with respect to the social and environmental effects of technological change is discussed, as is the effect of the science/art schism on modernism.

On the basis of this social and technological history, the paper seeks to outline potential models and opportunities for the activities of artists in the post-industrial period. Works by Duchamp, Tinguely and Takis are discussed as examples of artworks of the first machine age, and as structural models for contemporary work.

Methodology and critique for electronic art practice is explored with reference to (traditional) object oriented artists' methodologies and to qualities of the new electronic 'anti- terrain', particularly simulation and interactivity. The work of several artists who engage electronic technology are discussed as models for electronic art practice.

ORPHICS: COMPUTER GRAPHICS AND THE TEMPORAL DIMENSION OF ELECTRONIC COLOR

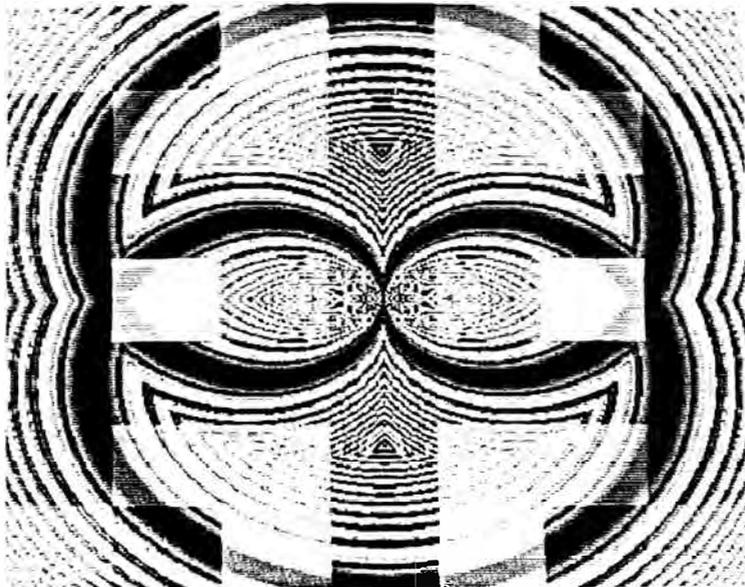
Zajec Edward

Art Media Studies Department, Syracuse University, Syracuse, New York, U.S.A.

Two years ago at the FISEA symposium in Utrecht I presented Orphics as an incipient model for a hypothetical language of light and sound. One of the tenets presented on that occasion was the hypothesis that if color can assume the emotional-expressive prominence that sound has for music, we will have to learn how to shape time in terms of dividual rather than individual forms. After some new experiences, I am now able to pose a few more questions and to add a few more details regarding the same tenet.

In particular, it seems that there exists an intimate relation tying the size of the dividual space constituents with the quality of a color experience. The question is: if colors are determined at boundaries, is it possible to talk about the quality of a color experience, after a certain size limit has been reached? I will present some of my recent work and some historical precedent to throw some light on this matter. The above picture blurs considerably if the speed of the color changes is added as a factor. All kinds of questions arise, about color contrasts as stipulated in traditional color theory, and about the nature of color musicality and its tempi.

Tying the above problematics is the question of compositional strategies. Is there an optimal strategy that would establish a biunivocal correspondence between the ordering in space of the dividual constituents and the ordering in time of the color tones? I will discuss several models including some experimental work done in this direction by my students, based on formal grammars and massive parallelism. And finally, I have a few things to say about the nature of electronic color in view of our emotional responses.



COMPUTER SIMULATION OF CALLIGRAPHIC PENS AND BRUSHES
Donoghue, Karen; Knowlton, Ken
Advanced Technologies Group, Wang Laboratories, Inc.
Lowell, MA
U.S.A

ABSTRACT:

A computer graphic method is described for simulation of calligraphic pens and brushes. Unlike a paint system which uses a mouse, here the artist uses a force-transducing pen to create realistic pen or brush strokes in real time. The system has been used for the production of western-style calligraphy and for writing with brush-based alphabets such as kanji.

Successive values of x , y , and pen-tablet force are measured, and others are derived--such as velocity, accumulated stroke length, and stationary dwell time. These are all used to define the momentary geometric footprint of pen or brush; the incremental geometry of the stroke depends in turn on rules for connecting successive such footprints. Additional rules may apply at the beginning or end of the stroke.

Crucial to the real-time aspects of the method are a very fast means for computing the momentary footprint, and for defining and filling the area connecting the current footprint with the previous one. This high-speed processing permits regular, uninterrupted acquisition of input data (thus avoiding improper polygonal faceting of curved strokes) and it produces a screen display without noticeable delay.

Later, hard copy output may be produced at higher resolution by recomputing from the same data.

SIMULATION AS ANIMATION

Caldwell, Craig; Linehan, Thomas E.; Parent, Richard E.
School of Art and Design, Northern Arizona University, Flagstaff, AZ
Computer Visualization Department, Texas A&M University, College Station, TX
Computer Information Science, Ohio State University, Columbus, OH
USA

Throughout the history of art, creative advances have paralleled technological advances in media, permitting the artist to illuminate new visual concepts. Such a situation exists today with the computer's assistance in synthesizing knowledge from different disciplines. *Physically-based simulation* permits such an integration and provides a *new* approach for the artist.

Because animation by computer is still primarily based on key frame techniques the resulting animations suffers from an absence of intriguing and expressive motion. What is needed is a method for generating motion which is analogous to how motion is generated in the real world. The *most viable alternative* is the adaptation of computer "simulation" techniques to an animation system. This paper outlines a functional approach for artists to use different simulation (kinematics and dynamics) systems in the design of computer animation (Figure 1).

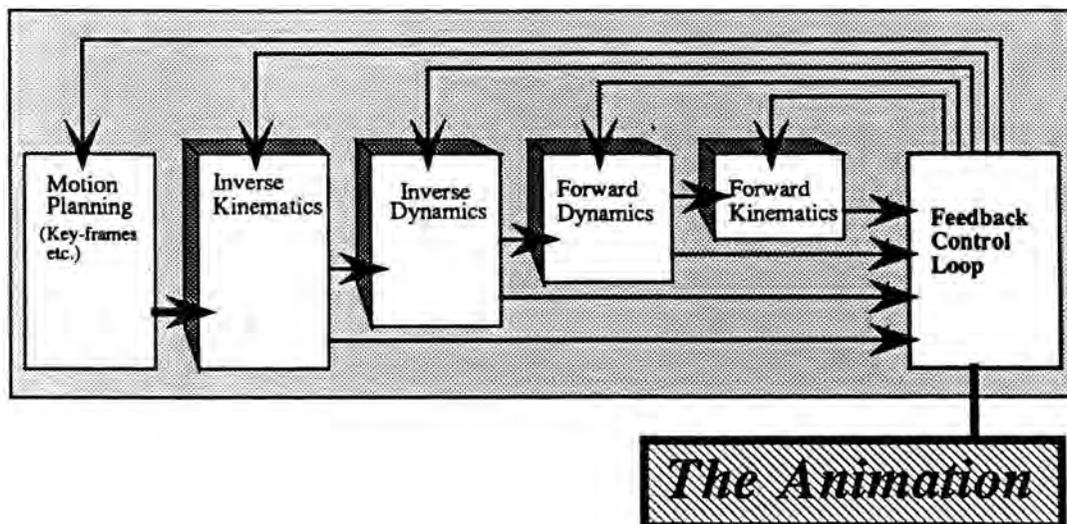


Figure 1. Motion Pipeline and its Modules.

Motion procedures are interconnected through a feedback control loop which permits the artist to determine how these modules will interact.

This paper addresses "How should such a physically-based simulation system be structured for its use in animation?" and "How does the proposed system extend the existing means or create new ends for the animator/artist?" The functional model proposed seeks to bridge the qualitative - often idiosyncratic - conceptual orientation of the artist with the quantitative orientation of computer simulation. This in turn will influence the creation of more subtle and sophisticated animations and expand the boundaries of the visual process (Figure 2).



Figure 2. Image from the animation "Balloon Guy" by Chris Wedge
This animation utilized dynamic simulation software developed by
Dave Haumann to achieve new levels of expressive and intriguing motion.

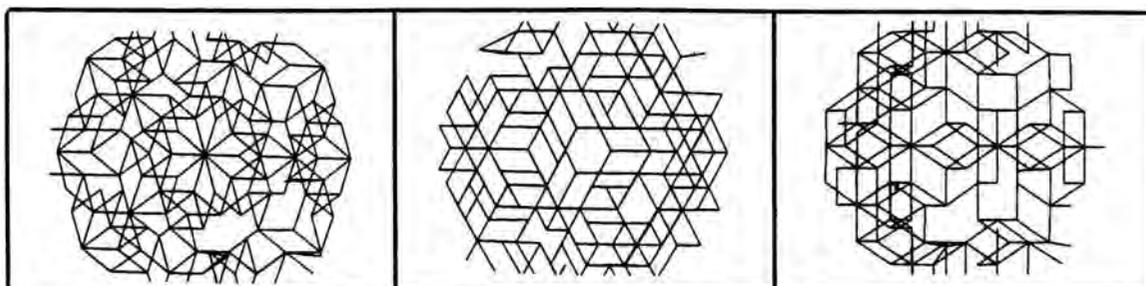
Quasicrystal Architecture
Robbin, Tony
Independent Artist
New York City
USA

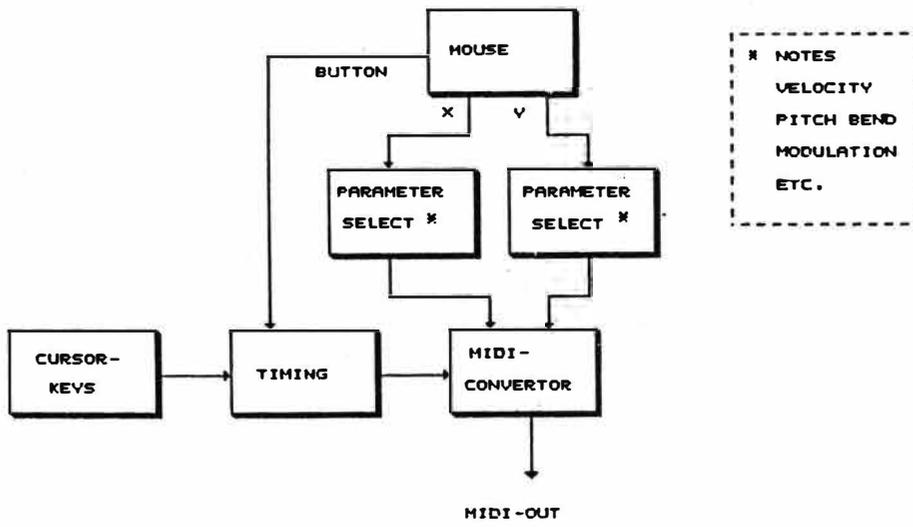
Quasicrystals are non-repeating patterns in three dimensional space. Developed only a few years ago for use in solid state physics, this new geometry has wonderful visual and structural properties when applied to architecture and environmental sculpture, works that elegantly express our modern experience of space.

A non-repeating pattern is an apparent paradox; we usually think of patterns as composed of regularly repeating elements. In quasicrystals there is regularity: all the nodes, edge lengths, and two dimensional shapes are identical, and only two similar three dimensional shapes make up the entire structure. Yet the pattern is non-repeating and consequently counter-intuitive and fascinating.

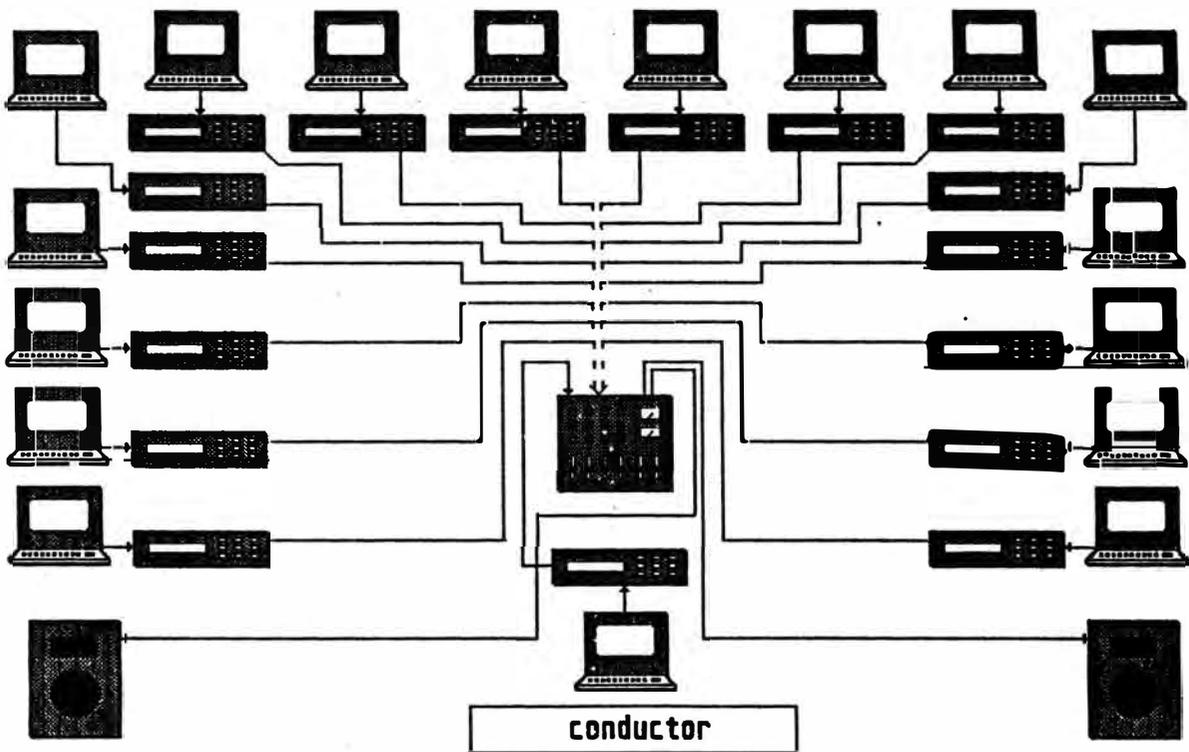
The three drawings below are all computer plots of the same quasicrystal dome. To the left is the plan of the dome; this plot also describes the shadows cast by the lattice members of the dome when the sun is directly overhead. In this view, the dome appears to be a five-pointed star pattern. Amazingly, the dome appears to be made up of triangles and hexagons when one is under the dome looking slightly to the left, and it appears to be squares when one is under the dome looking slightly to the right. But when one goes to where the triangles are, only pentagonal stars can be seen. As the sun passes overhead, from 10 AM, to Noon, to 2 PM the patterns on the floor transform to these computer plots.

Every quasicrystal dome, spaceframe, or vault has this two-fold, three-fold, and five-fold symmetry. They are exquisitely and magically responsive to both changes in light and the viewer's movement. Quasicrystal geometry is truly a modern mathematics, a geometry of flux, rich ambiguity and subtle order, and the architecture it generates powerfully embodies those contemporary qualities.





MOUSE-CONTROL FOR SOUND-MODULES



CONCERT FOR COMPUTER-ORCHESTRA
Ament, Julius
Academy of Music
Groningen
THE NETHERLANDS

PHILOSOPHY

By the growing possibilities of MIDI to automatize the performance of computer-music, more and more a concert-practice comes into being, where players are hardly really playing on the concert-platform and/or where players have a very reduced influence on the performance.

This concert-practice is not very attractive for the public, which the composers/performers often try to compensate by adding visual elements such as video-images or light-effects.

Because this does not seem a good solution to me, I began to develop a new, for public and players more attractive performance-practice for autonomous electronic music.

The idea was to let many players play together in a very direct way (without keyboard) on computers with sound-modules.

THE PERFORMANCE

The performance exists of a concert with a computer-orchestra existing of 16 Atari-ST-computers.

The computers are connected (MIDI) with 16 sampling-modules.

16 players are directly controlling the computers (without keyboard) with the help of for this purpose specially developed computer-programs.

You can see the concept for the performance at figure 1.

THE SOFTWARE

The function of the software is to control many MIDI-parameters of the modules with the mouse of the computer.

You can freely choose 2 midi-parameters (notes, velocity, pitch-bend, modulation etc.) for the co-ordinates (x and y) of the mouse. These parameters are translated in midi-information. There is also information about start, length, repeat and stop from the timing-module. This module is controlled by the button of the mouse and the cursor-keys of the computer.

You can see the concept for the software (mouse-control) at figure 2.

Julius Ament

"ESHROADEPIPEL"

Settel, Zack

Independent Artist

Paris

FRANCE

This is a solo piece for clarinet (and bass clarinet) in which the computer coordinates both the electronic accompaniment as well as the timbral extensions (signal processing) of the instrument, whose audio signal is analyzed live, thus allowing for very fine control over the electronics. At times, the sounds of the clarinet are both transformed by signal processors, and mixed with very similar electronic counterparts which are controlled by the player as a function of his/her playing. The attempt of this piece is to extend the range of the "solo piece", while preserving the role of the soloist. The computer executes/coordinates the following:

- reconfiguration of the signal paths (clarinet, synthesis and signal processors)
- dynamic parameter control of the synthesis and signal processing modules (harmonizers, delays etc...)
- real time analysis of the soloist's performance (pitch and envelope following) for control over the electronic accompaniment and its synthesis parameters
- reassignment of the performer's control signals (pedals, pitch and amplitude envelope) to various software processes which control the above
- signal processing of the *control signals* coming from the player

This piece is intended for live performance and requires equipment which is quite standard. The electronic score is written in *Patcher*, a control signal processing language developed at IRCAM.

Text: Kombination XI

Combination 11

(Helmut Heissenbüttel, Hamburg/Stuttgart, 1956
translation by Stephen Travis Pope, Vienna, 1978)

(1)

Die Nacht ist ein Muster aus Bogenlampen und Autorücklichtern.

The night is a pattern of arc lamps and auto taillights.

Auf der reglosen Fläche der Alster stehen die weissen Fahnen der Nacht.

On the calm surface of the Alster (river) stand the white flags of night.

Unter den Bäumen gehen die Schatten.

Under the trees walk the shadows.

Ich bin's.

It's me.

(2)

Dunkelkammergespräche

Dark-room-discussions

Dunkelkammergedächtnis

Dark-room-memory

Schattengitter über dem schmelzenden Eis

Shadow-grids over the melting ice

Auf Spiegelstelzen stehen die Lichter am Ufer.

On mirror-stands stand the lights along the bank.

Die unbelichteten Stellen verblühen.

The unlight places wither.

(3)

All diese Sätze

All these sentences

Das Inventar der Gelegenheiten

The inventory of the possibilities

Vergiss nicht

Don't forget

Gerede von Schallplatten

Talking on records

Das Gedächtnis von Tonfilmstreifen die abgespielt sind

The memory of sound-film-strips that are played out

(4)

Und die Fragen sind die Sätze die ich nicht aussprechen kann.

And the questions are the sentences that I cannot pronounce.

Und die Gedanken sind die Vögel die wegfliegen und nicht wiederkommen.

And the thoughts are the birds that fly away and do not return.

Poem text copyright © 1956, Bechtle-Verlag. Used by permission.

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Poem text copyright © 1956, Bechtle-Verlag. Used by permission.

**KOMBINATION XI: A “Ritual Place” for Live and Processed Voices
based on the Poem by Helmut Heissenbüttel.**

Pope, Stephen Travis

Center for Computer Research in Music and Acoustics (CCRMA), Stanford University
Stanford, California
USA

Music for live speaker/actor and tape, Vienna/Palo Alto, 1978-1990, 17 Minutes

I came across the poem *Kombination XI* in 1977 in an anthology of contemporary German poetry. It immediately attracted me for several reasons. Its mood of ambivalent confusion and disorientation, and its imagery of walking along the river in Hamburg on a cold winter night seemed very familiar. The poem’s statement brings to mind the poet Robert Bly’s comment that grief and the process of grieving are doors to experiencing inner feelings. He says, “If I am not in touch with my grief, where is my grounding?”

The text itself is also very musical in its use of the sounds of the voice, moving from sentences constructed largely with plosive and nasal sounds to ones consisting almost entirely of sibilance and fricative sounds (i.e., noise). This setting of the poem intends to draw the beauty and the depth out of the text, rather than composing something around it. As with several of my compositions, I view *Kombination XI* as a ritual or a place where one goes—a mood and an environment described in sound. To use another quote from Robert Bly, this is because “Men do not learn, except in ritual spaces.” *Kombination XI* can best be listened to as liturgical music.

All of the sound material for the piece (with the exception of the pedal tone heard throughout), is derived from the recorded voices of two people (one male and one female), speaking the text of the poem with very different German accents. These sounds are processed and mixed in the style of *musique concrète* collages. The piece consists of 7 sections of approximately equal length. The recitation of the text is followed by a prelude, the four stanzas of the poem, and a postlude. The musical form is that of a rondo.

The original recording of the recitation by Manfred Bansleben and Ingeborg Eva Fontana took place at the Institut für Elektroakustische und Experimentelle Musik of the Vienna Music Academy in April, 1978 for a planned *musique concrète* tape composition. This analog tape was sampled onto a NeXT workstation using an Ariel analog-to-digital convertor at CCRMA in November, 1989. The voice sounds were processed and mixed using a software phase vocoder and the *cmusic* sound compiler program (both by F. Richard Moore), using the networks of NeXT workstations at CCRMA, and Sun SPARCstations at ParcPlace Systems, Inc. The *cmusic* score was produced using Smalltalk-80 EventGenerator software running on Sun SPARCstation and Apple Macintosh computers. A Dyaxis digital mixing system, Quantec room simulator and EMT echo plate were used in the mixing and post-production at CCRMA and the Quicksilver Studio in San Rafael, California.

In contrast to computer music which tries to be “artifact free,” I have not avoided the natural artifacts of the signal processing software, which I look at as part of the instrument, much like a violin’s bow noise. Specifically, I use the side-effects of very long and very short FFT windows with the phase vocoder (smearing in the frequency or time domains), as a timbral element.

"AMPLIFIED BODY, AUTOMATIC ARM AND THIRD HAND"

Stelarc
Visual and Performing Arts - Ballarat University College
Ballarat
AUSTRALIA

If the earlier events can be characterized as probing and piercing the body (the three films of the inside of the stomach, lungs and colon/the 25 body suspensions) determining the physical parameters and normal capabilities of the body, then the recent performances extend and enhance it visually and acoustically.

Body processes amplified include brainwaves (EEG), muscles (EMG), heartbeat (ECG), pulse (PLETHYSMOGRAM) and bloodflow (DOPPLER FLOW METER). Other transducers and sensors monitor limb motion and indicate body posture. The sound field is configured by buzzing, warbling, clicking, thumping, beeping and whooshing sounds - of triggered, random, repetitive and rhythmic sounds.

The artificial hand, attached to the right arm as an addition rather than a prosthetic replacement, is capable of independent motion, being activated by the EMG signals of the abdominal and leg muscles. It has a pinch-release, grasp-release, 290° wrist rotation (C.W. and C.C.W.) and a tactile feedback system for a rudimentary "sense of touch."

Whilst the body activates its extra manipulator, the real left arm is remote controlled-jerked into action by 2 muscle stimulators. Electrodes positioned on the flexor muscles and biceps curl the fingers inwards, bend the wrist and thrust the arm upwards. The triggering of the arm motions pace the performance and the stimulator signals are used as sound sources as are the motor sounds of the Third Hand mechanism.

The body performs in a structured and interactive lighting installation which flickers and flares responding and reacting to the electrical discharges of the body -sometimes synchronizing, sometimes counterpointing. Light is not treated as an external illumination of the body but as a manifestation of the body rhythms.

The performance is a choreography of controlled, constrained and involuntary motions -of internal rhythms and external gestures. It is an interplay between physiological control and electronic modulation. Of human functions and machine enhancement.

THE DATAGLOVE AS AUDIOVISUAL INSTRUMENT

Abbado, Adriano
Independent Artist
Milan
ITALY

In the quest for audiovisual art that has been lead in the recent years, the need of a device that handles both audio and video events has become clear.

The DataGlove, developed by VPL Research Inc., can be considered a very flexible tool of interaction, an ideal instrument to control audiovisual events. In fact, the DataGlove is neither a musical instrument, like a keyboard, nor a pictorial tool like a tablet. It is a neutral device.

In the performance "Clouds", I have used a DataGlove to control audiovisual events that were previously made with my software AV, running on a Macintosh II. In this performance, the performer, wearing a DataGlove, navigates with his hand in an audiovisual hyperspace, passing through many different audiovisual cells, and creates a sort of interactive abstract film.

The hyperspace can be imagined as a 2 meter wide cube, located in the real world, and made of little cells. Each cell, located along the 3 axes x y z, "contains" a micro sequence (0.5 to 4 seconds) of audiovisual events: animations and synthetic sounds. Adjacent cells are related to one another. The last concept is absolutely fundamental. Without spatial coherence among cells, the navigation would be in fact totally meaningless.

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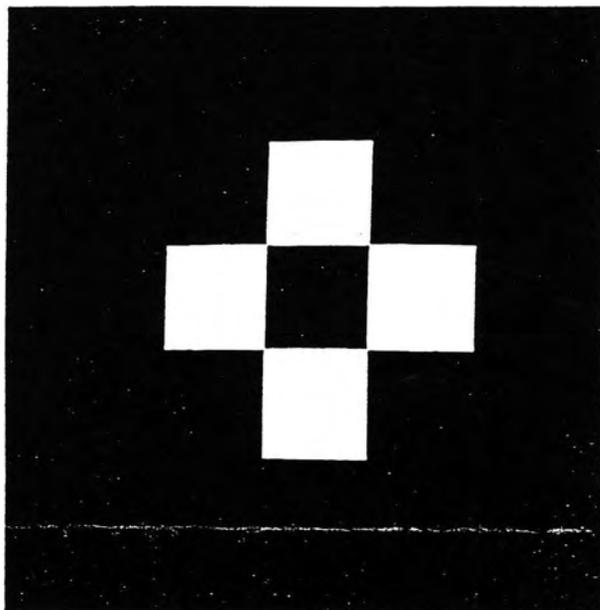
David J. Sturman, David Zeltzer, Steve Pieper
HANDS-ON INTERACTION WITH VIRTUAL ENVIRONMENTS
UIST '89: ACM SIGGRAPH/SIGCHI

Edmonds Ernest (with Jean-Pierre Husquinet and Musicians)
LUTCHI Research Centre
Loughborough University of Technology
Loughborough, Leicestershire
UK

Note the parallel proposal for a paper at SISEA, "The development of the video construct".

The piece uses live and electronic music as well as video projection. The structure of the music is closely related to the structure of the (colour) video construct. The first such composition will be performed in Liège in May 1990. More details of the concepts can be seen in the proposed paper outline and in the FISEA paper by Edmonds.

A piece will be composed especially for SISEA and will last approximately twenty minutes.



FOR ME AND FOR MY GODS

Karkowski, Zbigniew; Bilting, Ulf

Computer Music Studio at Chalmers University of Technology

Gothenburg

SWEDEN

The project was commissioned by the Council for Art Developments at the University of Gothenburg, Sweden. A system for interactive composition and conducting was created by the composers at the Computer Music Studio at Chalmers University of Technology, Gothenburg, Sweden during 1989-90. The first performance took place at STEIM, Amsterdam in February 1990.

The main idea of the project is to create an environment where the performer on stage could act both as composer and conductor, without being attached to wires or strange contraptions. The instrument provides the performer with real time control over parameters such as dynamics, tempo and articulation as well as the creation of the formal structure.

The system consists of a spatial structure with infrared transmitters/detectors scanning the performer's position and velocity of movements. The data are analysed and transformed by a custom designed sequencing program.

Duration: approximately 20 minutes.

Zbigniew Karkowski, born 1958 in Cracow, Poland, has studied composition at the State College of Music in Gothenburg, Sweden. Since 1985 he is actively working as a composer of instrumental and electroacoustic music. His music has been performed in many countries including such festivals as Darmstadt -88, ICMC Cologne -88 and Wiener Festwochen -89. He has been working as guest composer at Ateliérs UPIC in Paris and at STEIM in Amsterdam.

Ulf Bilting, born 1955 in Sweden, is a computer scientist and composer working at Chalmers University of Technology where he is also teaching computer music courses. He has been working together with Karkowski since 1985 in various projects including the above mentioned and an LP record *Bad-Bye Engine* released in 1988 by Radium Records, Sweden.

SEARCHING PICTORIAL DATABASES BY MEANS OF DEPICTION
Scrivener, Stephen AR and Charles, Stephen
LUTCHI Research Centre, Loughborough University of Technology
Loughborough, LE11 3TU
ENGLAND

Information technology systems are capable, in general, of storing at a low cost large volumes of pictorial data and we should anticipate a growth in the use of pictures and hence an increased reliance on pictorial databases. However, pictorial databases will only be useful to the extent to which that allow the flexible and rapid search.

We draw a distinction between depictive and descriptive representations. Descriptive representations involve sign systems, such as language, which have arbitrary learned rules of interpretation linking the sign system to the represented objects or concepts. The information in a description is extrinsic, meaning that it only exists by being associated with externally defined rules of interpretation. In contrast a visually depictive representation is not dependent on externally defined rules of interpretation because it causes visual experience which is similar to that associated with the object, or scene, or event represented. Much of the information in a depiction is intrinsic, meaning it is not represented explicitly but can be extracted by inspection.

We argue that pictures are important because they, in part at least, depict and hence allow the viewer to take up information more efficiently because of the way in which they address visual perception and cognition. It follows from this that when searching for a target picture a user might find it easier to depict the picture rather than, or as well as, describing it.

Earlier methods for accessing pictorial databases make no provision for depictive search. In this paper, we describe a system that provides methods that include search by depiction. Essentially the user creates a "sketch" of the target picture from which the system extracts descriptions that are matched to descriptions of the pictures in the database. Such methods will be essential in electronic pictorial databases intended for artists and designers.

MUSEUM TECHNOLOGY: NEW LINKS TO INTERPRETING, PRESENTING, AND CREATING ART

Search, Patricia
Rensselaer Polytechnic Institute
Troy, New York
USA

For over 20 years, museum curators and administrators have recognized the important role that computers can play in museums. Since 1965 hundreds of large and small museums have adopted some form of computer technology into museum management, research, or exhibit presentation. Museum experts, including the American Association of Museums, have stressed the importance of introducing computers and other technology into museum learning, and the predictions for the 1990's suggest there will be a significant increase in the use of electronic displays in the museums and art galleries of the future.

However, despite the growing use of computers in a museum setting, museums and galleries have not endorsed the computer as a viable art medium. Artists working in electronic media flock to science museums and technology trade shows in order to exhibit their work.

Nevertheless, as more and more museums implement computer hardware and software into their exhibits, the curatorial philosophy of museums will shift from an object orientation to an information orientation, and this shift will effect on the way we interpret and define art, especially electronic art. This paper will trace the evolution of computers in museums and discuss the impact that high-tech exhibits and the changing philosophical role of the museum will have on the endorsement of electronic art. Technological advances in museum exhibits, presentations, and research facilities will alter the aesthetic criteria for defining art and initiate important changes in the way we market and determine the economic value of art. In the end, a new awareness and sensitivity to the creative and aesthetic dimensions of electronic art will emerge, along with a personal approach to interpreting art that redefines the relationship between art and "commodity" and enhances the relationship between art and technology.

SPACE SAILS

FISHER, ROB; ARTIST-IN-RESIDENCE IN ENGINEERING
COLLEGE OF ENGINEERING, THE PENNSYLVANIA STATE UNIVERSITY
UNIVERSITY PARK, PA 16802
USA

The Columbus 500 Space Sail Cup. This imaginative project has as its goal launching into space in 1992 solar powered sails and an Americas Cup style race to Mars orbit. International teams from the US, France, Canada, Italy, China, Japan and other nations are currently trying to raise money and public awareness in support of this visionary event. At an executive committee meeting of the Columbus 500 Space Sail Cup Commission Rob Fisher, Artist-in-Residence in Engineering at Penn State, proposed that his advanced computer graphics students produce, as Penn State's contribution to the project, a promotional videotape that illustrates the program and the concept of solar sailing. Since part of the objective of the event is to stimulate an interest in space among young people, the commission gladly accepted the offer.

Space Sail teams of scientists and engineers supplied data, sketches, computer studies and sometimes only written descriptions from which the students derived the illustrations of the sails. Under the direction of several skilled animators, six advanced students from fields of art, physics, English, video, and engineering merged their talents in the first major production from the Visual Engineering Lab at Penn State.

Funded by a variety of programs at Penn State and produced in cooperation with WPSX-TV, a local public television affiliate, "Space Sails" represents a remarkable example of a project oriented educational experience.

All the animations were produced on Amiga 2500 computers using a variety of paint and 3-D software, digitized space photos, frame grabbers, and frame buffers. The final images were transferred onto "Beta-Cam Sp" tape using computer controlled single frame animation software.

TEMPORAL COHERENCE WITH DIGITAL COLOR

Evans, Brian
Vanderbilt University
Nashville, TN
USA

This presentation illustrates a technique for rigorous control of color relationships in abstract animation. It shows that it is possible to create coherent compositions with a formal foundation in the color evolution.[1]

To effectively structure time with abstract visual materials requires a visual grammar - a time-based formalization of line, shape and color. Color is especially problematic. Turning to the dynamic of tension-release, to the idea of neutral, balanced and weighted color domains, and to the discrete nature of computer raster images, it is possible to devise and implement a syntax for structuring time with color. We can measure and create color domains that have a dynamic relationship and hence create time-based color compositions.

Using parametrically defined color palettes, *Color Study #7* illustrates one method of applying these ideas to temporal color composition.[2] An analysis of the compositional approach used with respect to the evolving color relationships in the study reveals an underlying arch form. The arch form is a common musical architecture with the focus or climax of the piece occurring in the middle. The closing half works its way to the end as a loosely mirrored unravelling of the first half.

While codifying what has become a common filmmaking practice, it is hoped that this work will also encourage anyone interested in aesthetically strengthening visual presentation to explore the development of viable time-based visual grammars.

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STANDARDS FOR MUSIC REPRESENTATION

Dannenberg, Roger
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Pittsburgh, PA 15213
USA

How have standards helped performers and composers of experimental music? I raise this question because I think the question of standards per se is not so interesting: manufacturers will set standards for electronic entertainment devices to create a mass market for their goods. What is perhaps more interesting is how standards work for or against the experimental artist, for whom standards can be enabling or restrictive. One can only assume that forces at work in the music domain apply to the visual arts as well.

On the whole, standardization in the field of audio and computer music has greatly facilitated the production of experimental music, something that is quite surprising given that successful standardization efforts have all been driven by the consumer market. Successful standards include audio media formats (LP records, magnetic tape including cassettes, compact disks, and digital audio tape) and the MIDI (musical instrument digital interface) standard. Less successful efforts include attempts to develop standards for timbre specification and music printing.

The successful standards have been those that are fairly unbiased toward popular music, perhaps because there is great diversity even within the category of popular music. Audio formats are designed according to the limitations of the human auditory system, not the nature of the information to be encoded. Similarly, MIDI was designed to encode human gestures as detected by musical keyboards augmented with various pressure and position sensors. Although more keyboard-oriented than many would wish, MIDI has proven to be quite flexible. The performance-level standard set by MIDI has become an important computer interface standard. It is interesting to speculate on whether there is an analog in the visual domain.

MULTIMEDIA STANDARDS

Lauzzana, Raymond

HKU

Utrecht

THE NETHERLANDS

The integration of words, images, sounds and programs into a single work is a goal of many interactive artists. Advances in interactive art forms, such as hypermedia, simulation systems, virtual & artificial reality, interactive compact discs, etc., have lead to a need for the establishment of multi-media standards.

Interactive art works require a media which allows for the recording of audio, video, digital and textual information. Standardization in the film and video industry has permitted the proliferation of motion pictures. Similar standards for interactive media may have a similar impact on interactive art. If interactive art works are to receive widespread distribution, the protocols for recording these works must be standardized.

High-level structural standards, (i.e. PDES and SGML), as well as lower-level encoding standards (i.e. NTSC, PAL and MIDI), will be discussed. Particular attention will be focused on possible standards for device independent video/audio/digital CDs and their associated software protocols. Hopefully, a standing committee of ISEA may be formed to monitor and participate in various international standards activities.

STANDARDIZATION OF MUSIC REPRESENTATIONS

Pope, Stephen Travis

Center for Computer Research in Music and Acoustics (CCRMA), Stanford University
Stanford, California
USA

The field of computer music and “electronic music processing” has a unique and strained relationship to standardization and to (capital-S) Standards.

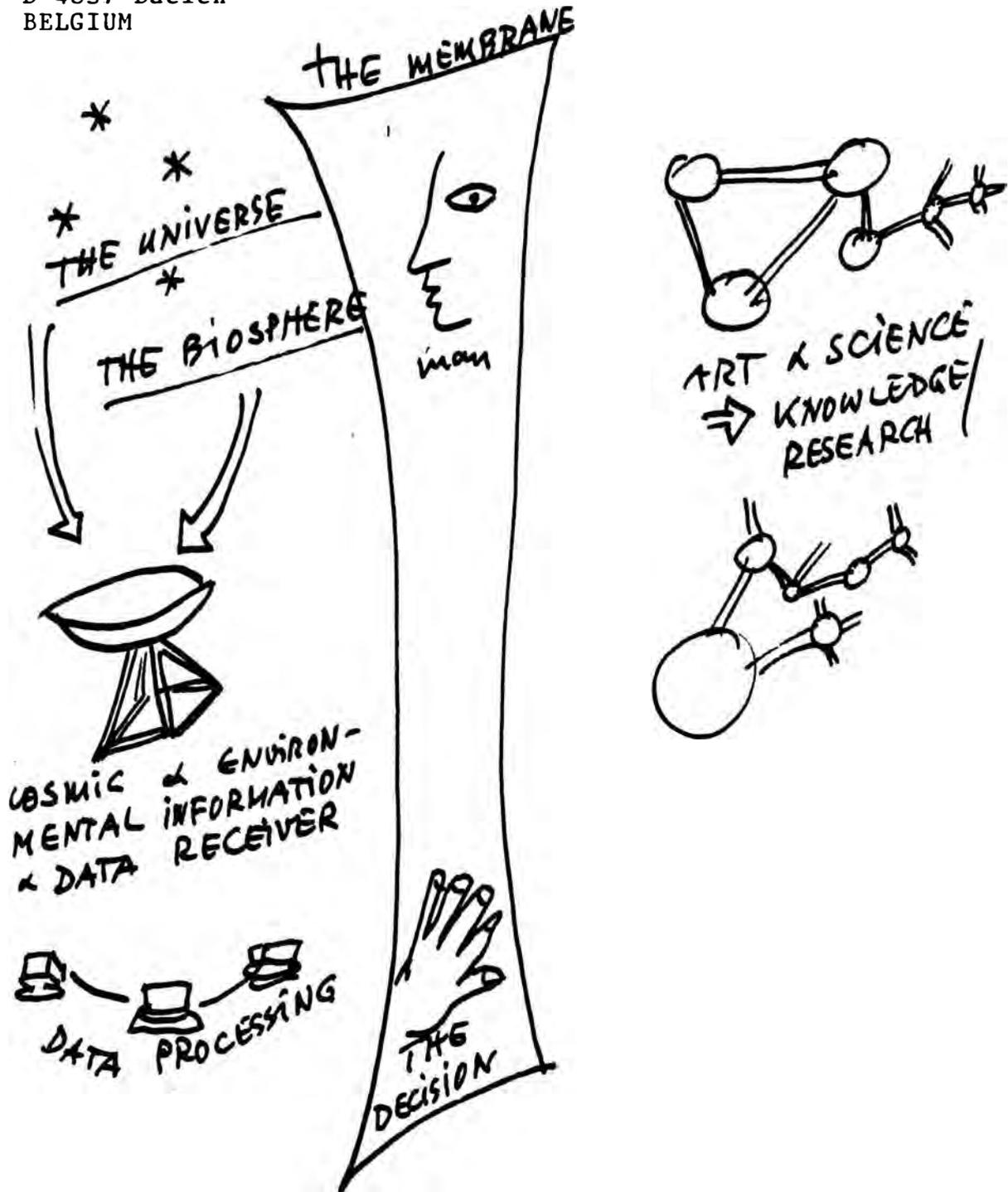
On the one hand, there are very powerful and widely-accepted de-facto standards for several areas, such as real-time note-oriented music performance interchange protocol (MIDI), machine-readable music representations (DARMS, Music-V), printed representation of music (common-practise western music notation (CMN), PostScript), and audio storage media (CD digital and AES/EBU formats).

Despite these existing (lower-case-s) standards, two problems are well-identified and considered pressing by many in the computer music community. First, the levels of interoperability of computer-based musical instruments and software packages is depressingly low. It is often difficult to move data between synthesizers or software tools without losing information or having to do multiple levels of translation. Second, there is currently no widely-available representation for music that allows the representation of a wide range of musical parameters. All well-standardized representations (CMN, MIDI, sound) make very strong musical assumptions (e.g., enforcing the note/instrument dichotomy), and none handle musical structure (i.e., analytical or harmonic structure) or performance information (i.e., interpretation information (how) separated from note data (what)), very well.

For several years, there has been an ANSI-chartered Standardization effort for defining a “Standard Music Description Language” (SMDL). This author has a difficult relationship to this effort and is sceptical of the group’s chances for achieving a system which meets the needs of the community. At the 1989 International Computer Music Conference (ICMC), held in Columbus, Ohio USA, there was an afternoon of presentations and panel discussions about this effort, and the development of standard music representations in general. Several members of the research community presented their reflections as to the requirements for a SMDL.

The presentation in this panel will outline the requirements which have been identified by the computer music community, and contrast these with the current status of the SMDL committee, as well as a number of existing music representation languages. The two most important points to be made—which also apply very well to other art forms and media—are: 1) the large differences between *representations*, *description languages*, and an *interchange formats*; and 2) the diverse requirements of the research community, creative artists, and industrial consumers of the technology. At least in the case of the ANSI SMDL committee, the standardization effort has attempted to provide one specification which is supposed to be all three of the elements of part (1), and to address the needs of all three user/customer communities. This is the source of much of the scepticism on the part of various members of the computer music research community and of many composers and performers.

Claus, Jürgen
Media Artist, Author, Instructor at Munich Academy of Fine Arts
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Overoth 5
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BELGIUM



WE SEARCH FOR NEW AND MORE SPECIFIC CONNOTATIONS INSIDE THE ARTISTIC AND SCIENTIFIC MATRIX. FOR ME, SUCH BASIC CONNOTATIONS - INDEED A NEW PARADIGM - ARE RELATED TO THE FACT THAT:

- (1) "ORGANIC" MACHINES ARE MADE BY ARTISTS/ENGINEERS/SCIENTIST
- (2) USING ELECTRONICS/TECHNOLOGY ON ITS HIGHEST, MOST ADVANCED LEVEL INCLUDING RESPONSIVE INTERACTION
- (3) IN AN ECOLOGICALLY CLEAN, REASONABLE WAY
- (4) TO SERVE HUMAN AND NATURAL SURVIVAL AND/OR VITAL RECONSTRUCTION - AS METAPHORS AND SYMBOLS AND REALITIES.

SISEA ABSTRACTS

AESTHETICS OF ELECTRONIC ART

Claus, Jürgen

Centre Overoth Fondation Jürgen & Nora Claus

Overoth

BELGIUM

If we do agree that we had and still have aesthetic theories on different aspects of electronic art (for instance: Max Bense, Frank Popper, Abraham Moles a.o. on cybernetic art; René Berger, Douglas Davis a.o. on video art; Gene Youngblood, Roger F. Malina, Myron Krueger a.o. on interactive art) we may as well question the fact of an overview aesthetic theory on electronic art in general.

My own suggestion for the panel is to look close to the writings and theories of the artists themselves; to aim at a network of aesthetic "pigments" which are inherent in the theories from "within". My second suggestion would be: We cannot establish even particles of aesthetic theories without relating them to the giant reference system of our biosphere. In this it might be correct to speak of a survival theory.

YLEM -- ARTISTS USING SCIENCE AND TECHNOLOGY

Reiser, Beverly
President
Ylem / Artists Using Science & Technology
Oakland, California
USA

Stitt, Fred
Director
San Francisco Institute of Architecture
San Francisco, California
USA
(415) 254-9397

Ylem has been active in the San Francisco Bay Area since 1982 and is now an international association with over 200 members. The organization sponsors numerous events and exhibits, publishes a monthly newsletter, and an annual membership Directory.

Ylem members include artists who work with video, ionized gases, computers, lasers, holograms, robotics, and other non-traditional media. It also includes artists who use traditional media but who are inspired by the images, structures, and growth geometries of crystals, electromagnetic phenomena, biological self-replication, and fractals.

The Ylem organization helps keep members informed of opportunities to show their work in upcoming exhibits, competitions, conferences, etc. It also publicizes and shows members' work through its own publications and events.

The membership includes many well-known figures in the arts and sciences, as well as collectors, educators, students, art agents, architects and engineers, physicists and mathematicians.

Diverse techno-aesthetic interests are demonstrated every other month at the YLEM FORUMS. They include presentations by practicing scientists who appreciate the aesthetic values within their disciplines, and artists who enjoy the science and technology that underlie all art.

Ylem's feature annual publication is the ARTISTS USING SCIENCE AND TECHNOLOGY DIRECTORY. This is a directory of over two hundred creative artists who are working in diverse contemporary and electronic media, including video, neon, hi-tech sculpture, performance art, cosmic oriented painting, and computer graphics. The directory brings artists into direct contact with curators, art collectors, gallery owners, and educators.

Ylem publishes THE YLEM NEWSLETTER each month with the latest on exhibits, art opportunities, networking events, articles on advanced media-technology, and news of artists' projects and concepts.

SCRIABIN'S FOLLOWERS: THE U.S.S.R., KAZAN
(The presentation on 'PROMETHEUS' Studio)

Bulat M. Galejev, PhD
'PROMETHEUS' Studio, Aircraft Engeneering Institute
Kazan, U.S.S.R.

An out-of-the-way concert had taken place in Kazan, 1962, where the light line 'Luce' from Scriabin 'Prometheus' score have been reproduced just in accordance with the composer's conception. Having been established that time an experimental Studio 'Prometheus' attached to the Kazan Aviation Institute owes to just that performance for its name. A light instrument followed by another. The intention to extend the new art audience has led to the idea of composition creation by means of cinema just with the original technology, namely the films are shot on a black-and-white film but the final result makes sure of all the rainbow colors.

Developing Scriabin's ideas of a possible arts synthesis extension 'Prometheans' also experiment in the field of the 'light architecture'. Just in Kazan the first in the Soviet Union theatricalized show 'Son et Lumiere' was performed under the open sky and even without any actors. The 'Prometheus' Studio union with architects turned out to be beneficial, the light-music hall and the museum were established. Besides the light devices the spatial music multichannel apparatus has been elaborated letting to move sounds of music in any direction and trajectory inside the hall. Laser sweep, computer and video-technique experiments are being conducted.

'Prometheus' Studio organically combines art and technical experiments with scientific researches. The new becoming light-music intonation nature is being studied and the audiovisual polyphony principles are being elaborated. About 20 books have been published, devoted to all these questions, as well as a great number of scientific articles in both the Soviet and foreign press. By the way, it was just Kazan where all the All-Union conferences, seminars and festivals 'The Light and the Music' were held.

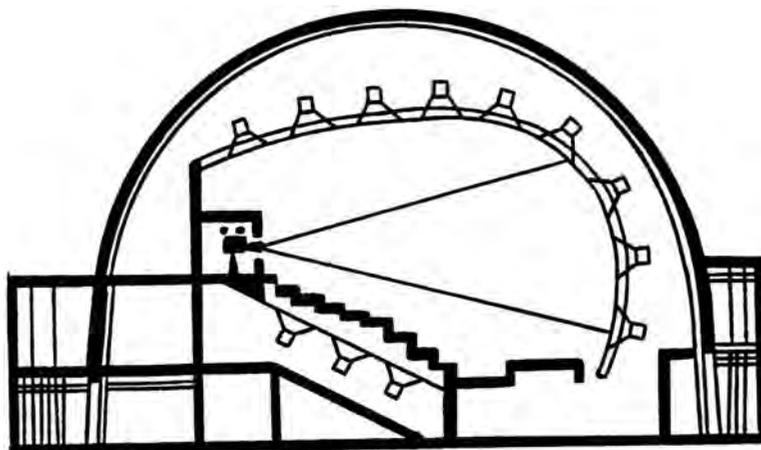


Fig.1. Spatial and Light-music Playback Hall Design

VISUAL ENGINEERING LABORATORY
FISHER, ROB; ARTIST-IN-RESIDENCE IN ENGINEERING
COLLEGE OF ENGINEERING, THE PENNSYLVANIA STATE UNIVERSITY
UNIVERSITY PARK, PA 16802
USA

The VEL is an experimental computer visualization facility located within the College of Engineering at Penn State University. It is under the auspices of the Artist-in-Residence in Engineering program. The philosophy of the lab is interdisciplinary, serving students and faculty from all sectors of the university. Typical classes contain a mix of engineering, science and art students who share their personal skills with each other in an informal atmosphere. Instruction on the computers is offered by advanced students with master classes in applications or lectures on aesthetics, philosophy and case studies.

Currently the lab consists of a dozen Amiga workstations of varying power donated by Commodore Business Machines. A DEC MicroVAX II GPX acts as a terminal linking the lab with the "backbone" of Penn State's larger computer facilities. Recent acquisition of a Silicon Graphics 4D220 GTX and Alias Software gives advanced students access to high performance capabilities.

The lab's activities include basic classes introducing students to the concept of computer graphics. Response has outstripped the capacity of the lab with more than 50 students per semester signing up for access to a limited facility with no formal structure as yet in an academic sense. Nonetheless, primarily through peer learning, observation and lectures, a creative body of work has been produced which will be shown on videotape. This tape, produced by one of the students, documents the lab, its philosophy and a sampling of student efforts.

Other activities include the special projects, directed by Rob Fisher, current Artist-in-Residence in Engineering. Among these are the Space Sails project which will be reviewed at a separate session, preparation of a 3-D architecture database for projection in a new science center planetarium, and computer graphics for a cable television program produced at Penn State.

Until such time as the lab receives formal recognition and funding, its activities depend upon the availability and interest of staff and faculty or the awarding of project contracts. The lab is evolving organically within the structure of a traditional engineering school at a major university. Its continuation is a sign that despite limited resources, there is a growing recognition that the facility is stimulating and is answering the needs of an emerging audience.

MUSIC PROCESSING AT L.I.M.

Haus, Goffredo

LIM - Laboratorio di Informatica Musicale
Dipartimento di Scienze dell'Informazione
Università degli Studi
Milano
ITALY

This work gives a brief overview of the scientific and aesthetic researches at the L.I.M. - Laboratorio di Informatica Musicale. Many projects have been carried on since 1975; they cover many areas in the field of computer applications to music; the main projects concern the following topics:

- * definition of formal methods for music information describing, with particular emphasis on Petri nets as the formal tool;
- * study and experimentation about advanced digital sound processing techniques;
- * design and implementation of software and hardware tools for music processing, with many levels of representation capability, both for real time and interactive systems;
- * study and experimentation about multimedia aesthetics.

The most relevant projects actually going on are:

- * the MUSIC Goal (LRC C4): "*Intelligent Music Workstation*" (IMW) is a project funded by the Italian National Research Council in the frame of the Second Finalized Project (PFI2) "SISTEMI INFORMATICI E CALCOLO PARALLELO", Subproject 7 "SISTEMI DI SUPPORTO AL LAVORO INTELLETTUALE"; the IMW is a three years project (June 1989-December 1992) devoted to the design and development of a musical software/hardware environment in which commercially available products are integrated with prototypal modules built up in the frame of musical informatics research;
- * the CSTI (Comitato Scienza e Tecnologia dell'Informazione) project is funded by the Italian National Research Council; it is a three years project (1989-1991) devoted to the design and development of an *Ethologist Audio Workstation* for the acquisition, analysis and graphic representation of both animals' and human beings' audio signals and for the inference of syntactic constraints recognized within their signals;
- * authoring systems for multimedia environments and prototypal multimedia based on music topics, that are one of the central areas of finalized research at L.I.M.; CD-ROM+CD-DA (both on the same disc) and CD-I are particularly considered; we are developing a general authoring system for multimedia in the HyperCard environment; we are also working at prototypes for music didactics on the NeXT computer.

Then, educational activities, performances, music productions, facilities and the staff are described.

STATE OF THE ART IN YUGOSLAVIA

**Predarg, Sidjanin
Independent Artist**

YUGOSLAVIA

The first generation of authors of computer art in Yugoslavia acted during the 1960's under the patronage of the international movement of NEW TENDENCY. The isolated support of modern art gallery in Zagreb was not sufficient to hold these authors in the country so that the majority of them left for abroad where the working conditions, social status and the appreciation were more acceptable. During the 1970's, in the period of irrelevant art and early 1980's, in the period of coming back to the picture, any action within the computer art was sporadic, almost not existing. The second half of the 1980's brings the change limited by the possibility of purchasing the available computer technology and now, already recognizable, the second generation of computer artist in Yugoslavia was developing in a broader sense. The presence and the success of these artists at the international scene will inevitably lead to the verification of the position of these artists in the field of the modern art in Yugoslavia.

AMIGA COMPUTERS IN A LOW COST INTERACTIVE INTEGRATED MEDIA NETWORK

Alik, Kristi
Assistant Professor, School of Music
Queens University
Kingston, CANADA.

Mulder, Robert
New Media Artist
LumiArt Audiovisual Laboratory
Kingston, CANADA.

The artists recently completed an interactive Music/Theatre piece (Electronic Purgatory) which combines the forces of computer generated visuals, computer controlled multi-image slide projection, computer controlled electroacoustic music, and "live" performers.

From the inception to the completion of their project, the artists developed the piece on three equally important parallel levels:

i) **HARDWARE LEVEL:**

They decided that a proper network had to be developed which would give each artist his/her own control station (input terminal). The system had to be readily available, inexpensive and portable. For this purpose they decided to employ two Amiga computers, which would share the burden of the systems operation as follows:

- 1) The music computer which runs "M", an intelligent music software package, SoundScape, a music sequencer, and MIDImouse which is used to control parameters in both "M" and SoundScape.
- 2) The visual computer, which runs Mandala, and is used for interactive detection, image sequencing, and control of the multi-image slide system. Multi-tasking with Mandala is MIDImouse, which is used to synchronize visual events to the music sequencer. The artists connected the two computers to a two-way MIDI communication network which would allow them to exchange crucial cueing and timing information.

AMIGA COMPUTERS IN A LOW COST INTERACTIVE INTEGRATED MEDIA NETWORK

ii) STAGING LEVEL:

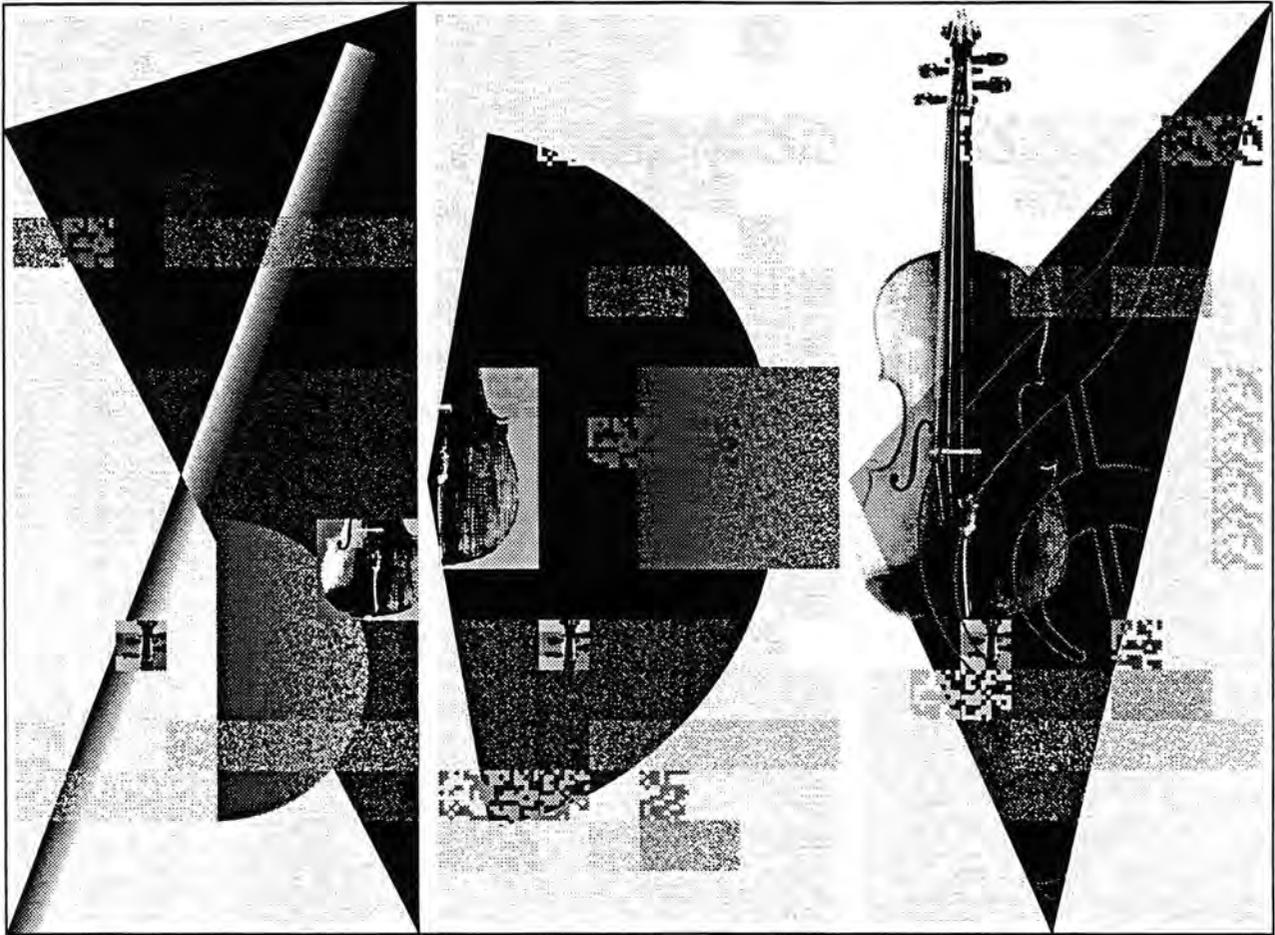
Electronic Purgatory was devised as a performance piece in which the "live" performers are on a black, empty stage and the consequences of their physical interactions are heard in the music and seen on a lifesize video screen. This multiple reality staging method is uniquely "computeresque" and is at the core of this project.

iii) AESTHETIC LEVEL:

The relatively low resolution graphics, limited animations, and the marginal intelligence of the music software seemed at first to severely limit the creative parameters of the work. However, by thoughtful orchestration of the available media elements the artists were able to turn most of these limitations to their advantage.

They have formulated a set of aesthetic guidelines which are largely based on the careful manipulation of the perceptual models which allow an audience to experience two equally valid realities simultaneously.

The artists are presently enhancing the system with a voice control input, a true LAN communication link, and an optical/software modification which will allow the computer to select only certain performers on the stage for the interactive process.



Symphony, opus 1

90 x 66 cm

1990

Linotronic print

DIGITAL ROMANCE

Sherman, John F

Department of Art, Art History & Design

University of Notre Dame

Notre Dame, IN 46556

USA

The process by which I create images has dramatically changed: I use the NeXT and Macintosh computers using a combination of video capture, drawing software, and PostScript programming. I consider myself as having achieved a Digital Craft, that is, the learning of a new language — an expanded visual language through technology.

Many of my images are visual ideas that I have written down in the PostScript Page Description Language. I find it exciting that these images can only be created by writing a PostScript program. Creating an image in this way is a romantic endeavor for me, much as a composer finds writing a musical score a romantic endeavor. I use image-making about music as a direction because I find an analogy in music notation in the work I do. Music notation is a rich language that gives the composer the means to document and write a musical idea heard in the mind. Digital Craft is one of my languages. The greater the depth of understanding and experience in any language, the greater the vision of what is possible. These different languages allow different realities to exist.

I will present images in black and white as well as in color that can only be achieved with the aid of computers and high resolution printers. I feel the images have a magic about them that goes beyond their being only a technical achievement. In creating these images, I have learned that numbers and logic can create emotionally satisfying images. I have discovered algebra is capable of both documenting organic form or a pattern. Seeing the threads of all disciplines more intertwined than once imagined is a new way of thinking for me — I may get inspiration for a design from an equation as well as a painting, poem, or song.

UNIVERSAL CONSTRUCTOR

Frazer, John H

Department of Design in Industry, Faculty of Art and Design, University of Ulster
Belfast
Northern Ireland

The Universal Constructor is a working model of an interactive, intelligent landscape, environment and structure. The model consists of a baseboard which represents the landscape and a series of cells which can be stacked at specific locations on the landscape and can represent structure or environment. The model is described as intelligent because every cell and every landscape location contains an integrated circuit which can communicate with units above and below. Each cell and location also has an identifying code and is equipped with eight light emitting diodes which it can use to display the code or display any other state or message. The whole model thus knows where every unit is and what it is and this allows for the model to be interactive because anyone can change the configuration of the model, and the model as a whole then knows what changes have been made and can respond in turn.

Thus an observer/participant is able to interact with the constructor by moving, adding or removing cells. Because the model is machine readable the collective intelligence of the cells is able to deduce the changes made and respond by requesting further changes to be made. The individual cells are programmed with rules which determine the behaviour of the whole assembly. The final form of the assembly of cells is analogous to the phenotypic reaction of genes (in the cells) to an environment (the spectator/participant).

HAIR SALON TV
Paterson, Nancy
Independent Artist
Toronto
CANADA

HAIR SALON TV is a multiple monitor video installation in which computer-controlled imagery is juxtaposed to reveal the diverse roles which women occupy within our high-tech culture. The chrome helmets of three women's hairstyling chairs are fitted with 11" colour monitors. The imagery shown is taken from a variety of sources including broadcast television and original footage. Imagery is divided into three thematic areas: women and domestic technology - for housework, beauty and fashion; women and technology in the workplace; and the role of women in scientific research and development. Depending on the particular interval pattern selected by the computer, imagery may appear different (or the same) on all 3 monitors, or in various combinations of two the same and one different. Juxtaposition of imagery demonstrates myth and ideology stretched to reveal the irony of women's expectations of technological developments. HAIR SALON TV counters the optimism and passive acceptance which women are expected to feel towards technology with the real impact it has had on their lives.

COMPUTER GRAPHICS, MATHEMATICAL RESEARCH AND ART

Emmer, Michele

Facoltà di Scienze M. F. N., Università della Tuscia

Viterbo

ITALY

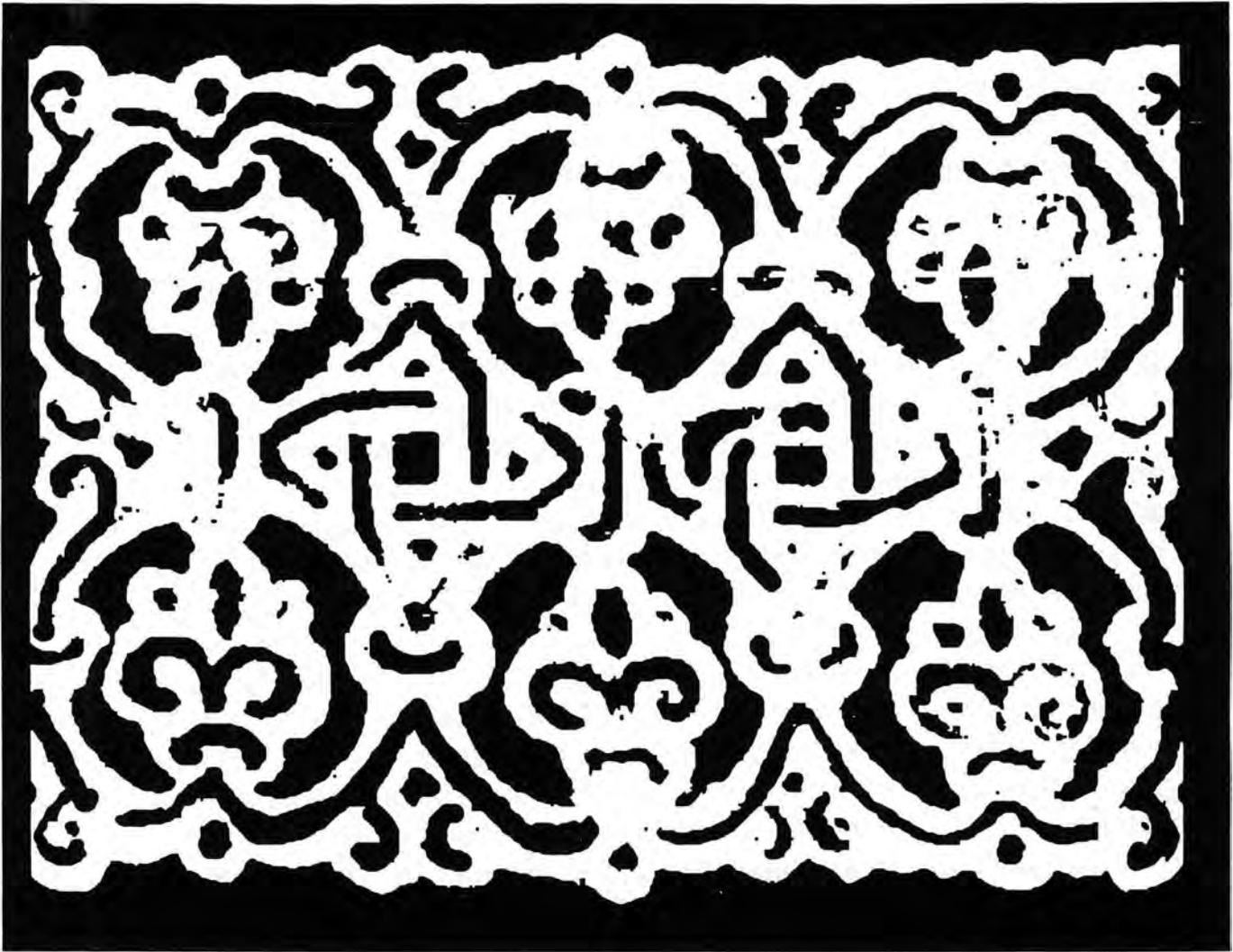
In the last years the use of more and more sophisticated computers with graphics facilities has been changing the way of working of mathematicians. In particular the use of computer graphics techniques has been used not only just to visualize already known phenomena but in a more interesting way to understand how to solve problems not completely solved. In some specific cases such techniques have provided a *new way* of proving results in mathematical research. It can be said that a new branch of mathematics has been developing in the last few years that can be called *Visual Mathematics* [1].

Mathematicians have obtained images whose aesthetic appeal has also concerned people who are not strictly interested in the scientific questions that originated them [2]. A interesting example is the discovery of a new types of minimal surfaces by William Meeks and David Hoffman. In this case the use of computer graphics was essential to obtain a formal proof of the existence of the new surfaces [3]. Apart from the mathematical interest, the images of the new minimal surfaces are so *beautiful* that David Hoffman has said: *This collaboration of art and science produced something significant to both fields*

Another interesting example is the *Renaissance Team*, [4] an interdisciplinary group of artists, scientists and mathematicians working at the National Center for Supercomputing Applications (NCSA) at Urbana. The use of computers gives rise to new problems for mathematicians, a kind of new *philosophy* is perhaps needed; computer graphics could be the future unifying language between art and science and perhaps not; in any case artists will have to face the impact of new mathematical results on their work [5].

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scan from Marseille Bible, Toledo Spain, 1260
manuscript 1626
biliotheque municipale, Marseille, France

(source for Cynthia Rubin)

THE COMPUTER AND ARTISTIC PROCESS: BREAKING THE CONFINES OF TRADITIONAL MEDIA

Rubin, Cynthia Beth
Department of Art, The University of Vermont
Burlington, Vermont
U.S.A.

The computer has provided me with the means to develop imagery that could not have evolved within the confines of traditional media. I am not referring to the product, which might resemble a painting, but to the processes available to the computer artist, which are uniquely suited to restructuring the traditional ways of conceiving imagery. Of particular interest is how the computer, with the addition of a scanner, can function as a vehicle for the direct interaction with visual sources.

My recent work incorporates motifs from medieval manuscripts. Because the computer frees the artist from the successive layering of physical paint, I can personalize my references by repeatedly going back and forth between templates of extracted designs and the developing computer painting. Through this interaction, the thinking of the medieval artist envelops the work in progress, influencing my own sensibility, and prompting me to cast off the earlier stages of the work.

Similarly, students and colleagues have made use of the non-linear qualities of computer painting. Several have worked with showing time and change within a single frame, or with redirecting multiple readings of an image, or with enveloping one image inside another. My presentation will include a fuller explanation of my own processes, with examples of both evolving imagery and additional completed works, and some related examples of work by others.

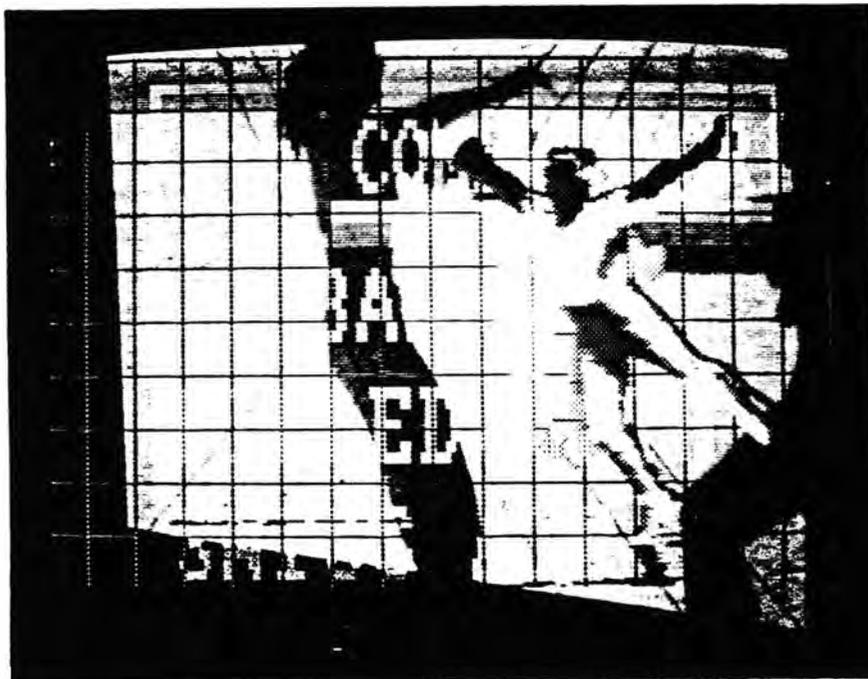
"SMARTER THAN DOGS: A VIDEO DOCUMENTARY OF A PERFORMANCE WORK"

Loveless, Richard L, and Marsh, Bruce

Center for Research in Arts and Technology, The University of South Florida, Tampa, Florida, U.S.A.

Artists have always asked new questions regarding the creative process. "Smarter Than Dogs," is a new performance work that explores the use of current technologies as a virtual "crossing point", where the boundaries of individual art forms are explored. The collaborators include a composer, a choreographer, two computer animators, a poet-text writer and a stage and lighting designer. As each artist introduces a sensory component, be it visual, text, sound, movement or light, all are capable of interacting with the others process electronically, making every performance unique. The performance exists in real time, yet it is interactive with earlier rehearsals as well as stored visual and audio events that have been composed and recorded as the collaboration evolved. These stored events are controlled by the movement of the dancers through light sensors that are connected to four computers through a midi-interface device and projected onto three 100 inch diagonal screens. At times three live video cameras are used to digitize and alter the performance in real time. Other times electronic music devices are used to alter the live performance of a vocalist, percussionist and cellist. Smarter Than Dogs explores relationships that extend beyond traditional models of performance. Each member of the audience is invited to participate in "controlling the context of the simulation." Ultimately we hope that people do not view our effort as a particular fascination with technology, but as a passion for exploring new traditions in the arts made possible by the new tools.

Smarter Than Dogs was first performed in February 1990 at the University of South Florida. Segments of a twenty-eight minute video documentary of the new performance work, commissioned by Commodore Business Machines Inc., will be presented at the Second International Symposium on Electronic Arts.



JACOB WRESTLING WITH THE ANGEL
Back, Doug
Independent Artist
Toronto
CANADA

JACOB WRESTLING WITH THE ANGEL consists of a video camera attached to a motorized camera mount, a video monitor and a number of objects arranged in a semi-circle around the camera. The motor rotates the camera similar to an airport surveillance camera. As the camera pans around the room, the motor pauses it as it points at each object. The objects are recorded on video tape along with audio tones which start and stop the motor. On play-back the camera pans around the room, stopping at each object as it did when the objects were recorded. To the viewer, it appears that the camera is "looking" at each object and displaying them on the video monitor. However, the camera is no longer on. The video monitor is showing pre-recorded images. The objects have all changed over time. Flowers which were fresh when the video was recorded now lie wilted on the floor; the monitor shows a block of ice in a pan, on the floor there is now a pan of water, etc. A position sensor attached to the motor sends information to an Apple II computer which changes this information to audio tones which are recorded on the video tape along with the video picture. On play-back the audio tones are sent back to the computer, and converted back to position information. The computer compares the position that was originally recorded, with the current position and can speed up the motor that the camera is mounted on, to synchronize the past to the present movement.

COMPUTER ASSISTED ENVIRONMENTAL SCULPTURE
FISHER, ROB
INDEPENDENT ARTIST
BELLEFONTE, PA 16823
USA

Since 1979 I have pioneered the application of computer visualization to large scale environmental sculpture. My projects have been reported in Leonardo, "NCGA Conference Proceedings" and "Sculpture Magazine". I will present several themes through slide illustrations of actual projects. The first focuses on the use of personal computers (the Amiga) as conceptualizing and presentation tools. Digitized images of the site with computer sketches of a sculpture concept superimposed will be demonstrated.

Once a commission is awarded I complete the design on high performance workstations (the Evans and Sutherland vector graphics system). Expert programmers input architectural and sculpture data. The visualization is studied in stereo to gain a better comprehension of the spatial characteristics of the problem. Dynamic motion and scaling permit views from any perspective point. Full scale sections of the sculpture are constructed concurrently in my studio to study light and material. The structure of the sculpture data is designed from the beginning to provide construction information once the form becomes finalized. This data not only gives me the quantity of each part and its dimensions, but also its location within the sculpture space.

From this research has evolved a new form of sculpture which is a metaphor of volumetric visualization. These "voxel sculptures" possess characteristics of transparency and density and exist within a virtual volume comprised of grids and lines. Illustrations for this section will include "Osaka Skyharp" a 50' suspended sculpture in Japan (1986), and "A Page from the Book of Skies" a 50' high x 100' long suspended sculpture for a new medical center in Saudi Arabia (1989). The last project I will show, "Fandango" (1990) clearly demonstrates the application of personal and high performance workstations in solving an enormously large and complex engineering and artistic problem. Engineering data drove both the sophisticated Amiga renderings and the E&S visualization. Slides of the completed artwork several hundred feet in scale will complete the presentation.

Computer Assisted Music Conducting

Molner, Ernest--(CMA & ISAST)

Doylestown, Ohio

U.S.A.

Some years ago, I devised an electro-mechanical-visual system of directing an orchestra using blinking lights mounted on music stands, controlled by a keyboard operated by the director. Refer to booklet entitled THE MOLNER ORCHESTRA CONDUCTOR as the historical basis for a new design system which is summarized as follows.

Computer Assisted Music Conducting is a computer system designed to assist the director of an orchestra, music ensemble and other performers requiring direction in a time based audio and/or visual presentation for live audiences, rehearsals, recordings, and other media, in a manner that will enhance communications between the director and performers. (This paper describes music performances.)

The music score is processed and entered into the computer. The director controls the CPU with the full score displayed on his monitor (VDT). The musicians will read their parts from monitors replacing the customary music stands.

The tempo is set by the director from his CPU keyboard by pressing a number key in the rhythm of the music to be played. As soon as the director presses the number or key on the CPU, it appears in the correct rhythmic position on each player's monitor screen above the music note or rest sign. Metronomic tempo markings may be used on an automatic basis, or the director can independently press (and release) keys at the appropriate tempo, including retardation or acceleration.

For parts having no music or rest bars, entrance cues are provided by the program or director. The score and parts viewed on the monitors will display all dynamic and expression markings as written by the composer, or as it normally appears on the printed music score and instrumental part. The director will be able to add, modify and emphasize expressions as he deems necessary, including communication by words, phrases, sentences, to be displayed on all or selected monitor screens.

SISEA ABSTRACTS

INTACT: A SYSTEM FOR THE DESIGN OF DYNAMICALLY INTERACTIVE SYSTEMS
Rokeby, David
Independant Artist
Toronto
CANADA

David Rokeby will be presenting the IntAct system, a combination of hardware and software which he has developed for the Macintosh computer. IntAct allows artists to create music and video installations that respond in real-time modifiable object oriented programming language, a syntax and vocabulary enforcing editor, real-time video motion analysis hardware, strong support for MIDI input and output and the control of videodisc players, plus a range of graphic tools for the shaping of interactive responses.

THE ELECTRONIC MEDIA LABORATORY

Scrivener, Stephen AR

LUTCHI Research Centre, Loughborough University of Technology

Loughborough LE11 3TU

ENGLAND

The LUTCHI Research Centre is a UK centre of excellence in human-computer interaction research. The centre is organised in two laboratories, one of which is Electronic Media. The EML is concerned with the problems of providing electronic support for creative professional user, such as artists and designers, as early in the design process as possible, and also with HCI mediated through pictures in addition to words. The EML provides a focus for an interdisciplinary team of researchers, including mathematicians, computer and colour scientists, artists, designers, linguists, and psychologists. The projects listed below will be described in outline:

- querying pictorial databases using pictures;
- computer colour appearance models;
- modelling the relationship between colour and emotion;
- knowledge acquisition in design (page layout);
- drawing and picture understanding systems;
- cooperative design over electronic networks; and
- using pictures in expert systems.

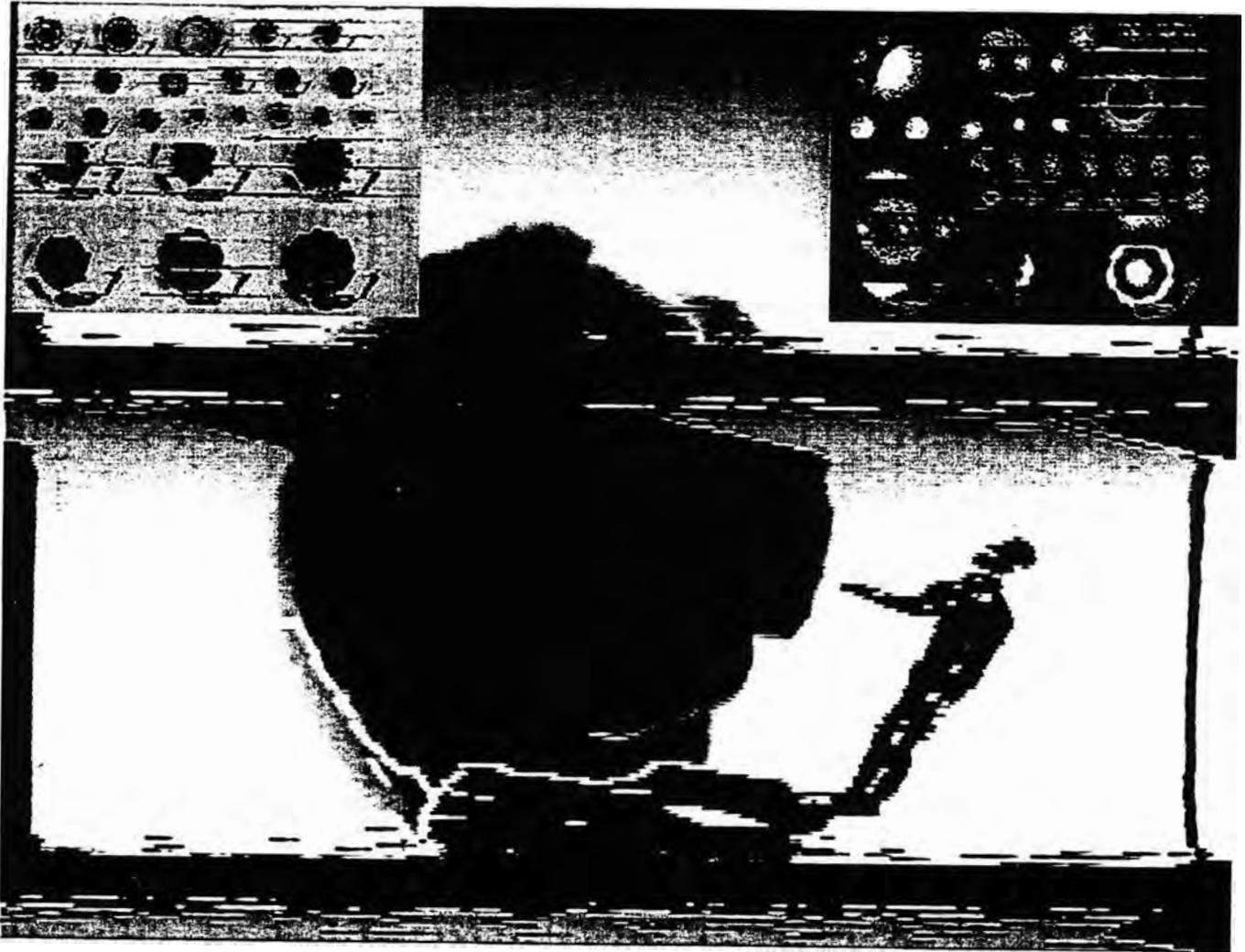
The aim of the presentation will be to show how these projects are linked by an interest in human problem solving activities that involve communication through or about pictures, and the need to control key pictorial properties (such as colour) and to understand the role of pictures in supporting cognitive function.

Christine Schöpf ARS ELECTRONICA Austria.

The presentation gives an outline of the development of the 'Festival Ars Electronica' from 1979 onward and the aim of the 'Prix Ars Electronica' as a prize contest for computerarts: graphics, animation, music and interactive art.

Furthermore, the presentation will particularly note the changing context in which the relation between art and technology is developing, and analyses, in connection, the changing possibilities for forms of presentation and the changing concepts of artistic projects.

Georg MÜhleck "Mangbetu" 1990, video still and videography



CENTRE COPIE ART inc.

presents copy/video/computer-works by
Phillippe Boissonet, Jacques Charbonneau, Marvin Gasoi,
Georg Mühleck and Sylvie Readman. Sound by Pierre Dostie.
Montréal (Québec)
CANADA

Centre Copie Art is a non-profit association run by a group of artists working in the field of electrographie, video and computer art. Founded in 1979 under the name of Galerie Motivation V, our Center is still the only space in Québec and Canada which works full time in production and promotion of electrography/copygraphy and its interaction with other media arts.

Artist Center in research and production

- A government program called "artists in residence" allows us to fund the work of some experienced artists. We offer an introduction to the new hardware and give workshops with professional artists from the field.
- Artists, graphists and students who use our equipment work on a daily basis with the assistance of a technician.
- Those who wish to develop a complex approach do so after having submitted a detailed project description to the director.
- University and college teachers are allowed in the local with their students for pedagogical sessions.

Diffusion

We constantly strive to present new facets of technological art to the public. Recent exhibitions have included works who rely on the interaction between electro-/copygraphy, video, laser and computer; sometimes also connecting with the so-called traditional art like painting, sculpture or mixed media. Since 1981 the Center has seen its members set up artistic links with places around the world. Some recent activities took place at the Goethe House New York (1988); Festival des Arts électroniques in Rennes, France (1988); Palazzo Listal/Basel (1988); Universidad Politecnica de Valencia (1988); Les Cent jours d'art contemporain de Montréal (1989).

Documentation

The Centers's 'library' includes artists' files, reviews, repertoires, magazines, catalogues, slides, films, videos, video prints, artist books and other original works of art.

Equipment

Copy machines: 1 Canon CLC (Colour); 2 Sharp CX 5000 (Colour); 1 Xerox 1005 (Colour); 1 Xerox 6500 (Colour); 1 Sharp 9300(b&w).
Accessory: 2 face lamination 63cm wide; heat press for transfers.
Video: 2 recorders Beta ½"; 1 Super VHS ½"; 1 Umatic 3/4"; 1 Color Corrector; 1 video printer UP 5000; 1 camera Beta ½"; 1 video 8; 1 video Hi8.
Computer: Amiga 2000 (10 Megs); freeze-frame polaroid, frame grabber; super-gen; and peripherics, all connectable with video.

Contact

Centre Copie Art inc., att. le directeur, 813 Ontario est,
Montréal, Qué. H2L 1P1, Canada.
Tel: (514) 523-4830. Fax: (514) 521-0226.

Centre Copie Art is supported by The Canada Council, Ministère des Affaires Culturelles du Québec and the City of Montréal.

COMMUNION AND CARGO CULTS

Brown, Paul

Creative Director, Advanced Computer Graphics Centre

Royal Melbourne Institute of Technology

AUSTRALIA

The countries of the first world discuss the inappropriate introduction of technology within the third world. One illustration is the Cargo Cults developed in the South Pacific as a result of insensitive air exploration. Nevertheless they remain largely unaware of the inappropriateness of the ultra-rapid development and introduction of information technology within their own culture. The development of high-bandwidth human computer interaction via 'virtual' interfaces will lead to intimate symbiosis between human consciousness and 'artificial' intelligence. One possible consequence of this is a new religion based on the current grass-roots belief in technology epitomized by the popularity of subjects like Chaos Theory. Tightly coupled human computer symbiosis promises an electronic communion for this new religion and the possibility of a new hi-tech cargo cult that, unlike its predecessors, actually 'delivers the goods'.

This paper explores some of the implications of this cargo cult by speculating on its effect on three areas of human experience: religion; entertainment and; authority.

Messiahs and Mandelbrot. Science and technology as the dominant belief system in the present era. Information transaction as a fundamental physical paradigm. Chaos and the Mysteries. Nirvana on demand and gods that answer back. TV evangelism versus electronic Zen. The new art in the service of the new religion.

Welcome to the Pleasure Dome. Toll-free infinite orgasms. Games and other interactions. Consumer kids and market forces. The new art as entertainment.

Politics and Control. Personal freedom versus adequate surveillance. Don't press your luck. Conformity and diversity. The new art in the service of authority.

Hacking out the New Frontier. Evolving a new medium. Freedom from mind-set - the role of youth. Graffiti and democracy. The new art as subversion.

The Frankenstein Complex. Fear and intimidation. Reaction in the face of ultra-rapid change. The evolution of the New Luddites. The new art and the new fascism.

The Emergent Matriarchy. Gender bias and the concept of the Feminine. Stelarc's view of maternity and symbiosis. Sally Pryors work on mind/body dualism and the rejection of the female. Network awareness and oceanic awareness.

Toward a Conscious Planet. Species identity and integration. The collective consciousness. De Chardin's Noosphere. Global Art.

THE MEASURE OF ALL THINGS. A SHORT HISTORY OF ANTHROPOMORPHISM IN ART AND SCIENCE

Penny, Simon

Electronic Intermedia program, Dept of Art, University of Florida.

Gainesville.

USA.

This paper seeks to outline a general drive in our species to anthropomorphism. It examines precedents in religious and mythological literature, and in medieval alchemy. It traces a line of representation (simulation) forward from the Venus of Willendorf, through Greek sculpture to kinesthetic representation in the anthropomorphic machine. This line continues through clockwork automata and the industrial revolution to cybernetics, Artificial Intelligence and robotics.

The psychology of the drive to anthropomorphism is considered, and in particular the gender politics of associated issues in biological engineering.

The idea of the robot as personification of fear/fascination with the technological complex is considered. The dual identity of the robot as technological reality and cultural icon is clarified. The relationship of cultural production to technological change in the industrial revolution, the 'modern' and 'postmodern' periods is examined. Aspects of Artificial Intelligence developments are examined with respect to the idea of 'intellectual' antropomorphism.

In science, strides toward the 'man made man' are made daily. It can be argued that the research is the territory of a small elite. However, in popular culture the 'man made man' is a reality and the public is enthralled. This paper explores the nature of the desire to artificially create people.

Illustrated with slides.

INTERNATIONAL SOCIETY FOR THE ARTS SCIENCES AND TECHNOLOGY (ISAST)
Malina, Roger F.
ISAST, Box 75, 1442A Walnut,
Berkeley, Ca, 94709
USA

The International Society for the Arts, Sciences and Technology (I.S.A.S.T.) is a non-profit professional organisation. The goal of ISAST is to encourage the interaction of the contemporary arts, sciences and technology. I.S.A.S.T. is the publisher of the international art journal LEONARDO.

LEONARDO was founded in 1967 by kinetic artist and space pioneer Frank J. Malina. LEONARDO was established to provide a forum where artists could write about their own work, particularly work which made use of contemporary science and technology. In addition LEONARDO provides a forum where scientists, engineers, and art scholars can present interdisciplinary discussions. In 1991, LEONARDO will increase its publication frequency to 6 issues a year. As part of this expansion, the LEONARDO Music Journal will be launched to provide an interdisciplinary journal focused on the use of sound in the arts. The LEONARDO Compact Disk series will also be issued, containing original recordings.

I.S.A.S.T. also publishes the Fine Art Science and Technology Database (FAST) containing directories of resources and information. FAST is available on-line on the MCI network and under ACEN on the WELL. FAST is also available on diskette.

I.S.A.S.T. also issues, on behalf of the Art, Science and Technology Network (ASTN), a biweekly electronic newsletter distributed over the academic networks.

I.S.A.S.T. establishes small working groups to work on interdisciplinary topics. The Space Art Working Group addresses the connections between art and space exploration. The Working Group publishes the quarterly Space Art News.

I.S.A.S.T. awards a number of Prizes annually. These include the LEONARDO Prize for a body of work, the New Horizons Award for innovative work in a new medium and the Maxwell Medal for Excellence in the Arts and Sciences.

I.S.A.S.T. seeks to collaborate with other interested organisations on projects. Collaborating organisations have included SIGGRAPH, the Fulbright Commission, the Inter-Society for the Electronic Arts, and the Australian Network for Art and Technology.

Throughout this century there have been repeated attempts to re-integrate the fragmented cultural fabric of the arts, sciences and technology. The arts of the future must take cognisance of developments in science and technology, developments which are re-shaping our own human nature and our environment.

THE COMPUTER MUSIC ASSOCIATION

Dannenberg, Roger B.; Research Coordinator CMA
School of Computer Science, Carnegie Mellon University
Pittsburg, PA 15213, USA

The Computer Music Association (CMA) is an organization of individuals and institutions dedicated to exploring the inter- influence of the creative and technological in the art and science of computer music. CMA co-sponsors the presentation of the annual International Computer Music Conference, which, since its inception in 1974, has become the pre-eminent yearly gathering of computer music practitioners from around the world. The ICMC's unique interleaving of professional paper presentations and concerts of new computer music compositions - juried by CMA-approved panels - creates a vital synthesis of the worlds of science, technology, and the art of music.

CMA provides worldwide information networking for the computer music community through its quarterly newsletter ARRAY, back issuance sales of all ICMC Proceedings to date, the CMA Source Book, and the newly proposed ICMC Proceedings Anthology, and CMA Recording Series.

In 1988, at the request of the X3V1.8M Work Group, CMA became the official Secretariat of the American National Standards Institute (ANSI) Standard Music Representation Language project. This ongoing research effort is charged with creating a standard language description and storage and interchange format for all forms of musical communication - sonic as well as graphic - to eventuate in their adoption by ANSI. CMA's participation in this project is consistent with the association's mission to serve as a nexus of information flow. Interested CMA members continue to be active and influential members of the SMRL Work Group.

Beyond this large, ongoing project, CMA is expanding its research sponsorship to include partnerships with non-profit and corporate institutions to establish CMA Resident Research Fellowships to sustain independent projects and creative activity in all aspects of computer music.

CMA memberships brings benefits and services, including discounts on all CMA Publications, Recordings, and ICMC registration fees; waiver of ICMC submission fees; discount on a Computer Music Journal subscription; subscription to the quarterly CMA newsletter ARRAY; joint international MIDI Association/CMA membership; and discounts on Performing Arts Networks email and EDI-PAN recordings.

TITLE: AUSTRALIAN CENTRE FOR THE ARTS AND
TECHNOLOGY (ACAT) : AN OVERVIEW

AUTHOR: Worrall, David

INSTITUTION: Canberra Institute of the Arts

CITY: Canberra

COUNTRY: Australia

Abstract

This presentation will outline the new Australian Centre for the Arts and Technology (ACAT) at the Canberra Institute of the Arts which concentrates its efforts in the fields of computer music and computer animation.

ACAT is somewhat unusual in that it grew out of an established electroacoustic music studio rather than a computer graphics and animation centre. As such it specialises in time-based interactions in the aural and visual domains.

The presentation will detail the research and development work in the area of music composition, animation and electrospatial art, leading to the establishment of the Centre and will outline its directions in the areas of education, performance, recording, publishing, consulting and research and development.

**Esthetics of Islamic Art
Potentials of the synergy
Science/ Art/ Spirituality**

By Chafchaoui Mohammed Aziz
Free Lance Multi-Media Artist
Casablanca, Morocco.

Islamic Art is of a sacred nature. The language of the Koran is omnipresent in the Islamic world and determines subsequently the types and measurements of art. The most profound relationship between the Koran and Islamic art is of transcendental nature: it is reflected not in the form of the Koran, but in its *HAQIQAH*: its essence without form is more specifically found in the concept of *TAWHID*, the Unity or the One, with its infinite contemplative implications. Islamic art is essentially the projection in the visual world of certain dimensions of the Divine Unity.

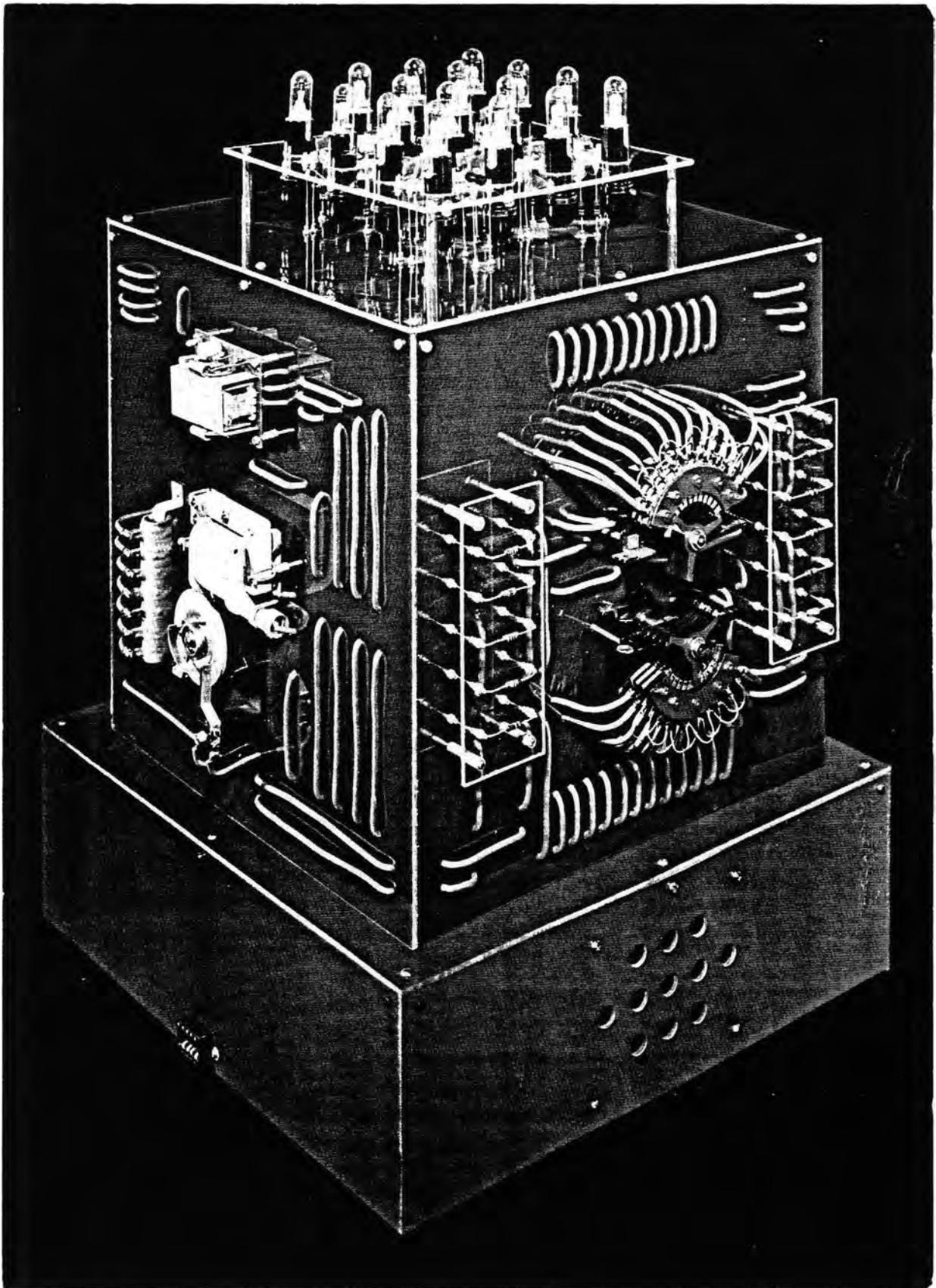
To summarize the essential characteristics of Islamic thought, we find that the muslim quest of the ultimate truth implies at once an awareness of the world of phenomena (the importance of science), but after this step we pass from the profane to the sacred. The entire Islamic theory of knowledge reposes on esoteric wisdom. The principal objective of the Koran, then, is to awaken in man the ultimate consciousness of his multiple relationships with God and the Universe. Science is practiced in order to decode the laws and mechanisms of the cosmos and reflect these qualities into Being capable of achieving Godhood, since he is at the image of God and created in His Image.

To express the *Unity of Being*, *Unity of Existence*, the muslim artist has 3 tools: *geometry* that manifests unity in the spatial order, *rythm* that manifests in the temporal order and *light*.. There is no better symbol of the *Divine Unity* than light. Thus, the aim of Islamic art is to transform matter into a vibration of light.

The contemporary expansion of technology, misunderstood and confused with science, has become a synonym for alienation, specialization, and division of knowledge. Nonetheless, the end of this century seems to bring together all the conditions for the development and generalization of previously inconceivable means of the performing of reality, of methods of formalization and modelization supported by important progress in mathematics, the technology of electronics, and extremely powerful methods of calculation and simulation.

Today's physics inform us that our environment is a complex of frequencies and angles; we live in a universe of multidimensional frequency-realms. Sight, sound, touch, tornados, nova, rocks and mosquitos and dolphins are all frequencies of varying levels of complexity.

It is from this *macroscopic* and *infraatomic* platform that electronic art must elaborate its vision, build up its knowledge, establish systems, interact with scientific and human experience; in short, it must master the limits of universal knowledge before it establishes the models that transcend it.



THE EVOLUTION OF ELECTROSCULPTURE

Gray, Ken
Department of Art, University of Alaska Anchorage
Anchorage
UNITED STATES OF AMERICA

My paper documents the evolution of my own creative research, which I have entitled Electrosculpture. Prior to 1972, when I concocted the word Electrosculpture, people had referred to my work as being kinetic or cybernetic. Although my work shares a common technology with these genres, the underlying intention of Electrosculpture, is its stimulus interface with the spectator, for without physical involvement the full potential of these works can not be realized. The sensing systems and responses upon which this work is founded are best accomplished through the use of electronics, which translates input stimulus into output audio/visual response. Electrosculpture is a fusion of these constituents.

Electrosculpture is site specific. It is essential to maintain a delicate balance, in order for the works to interact holistically with the environment, yet independently with each other through the interaction of the spectator. Such sculptures are at their best in a public place where a number of people can activate them simultaneously. In this situation the richest acoustic and visual patterns emerge. Thus, the activity becomes communal as spectators communicate with one another through the work.

Electrosculpture, attempts to form a partnership with people to encourage them to enter an era of new optimism in the future. We are no longer bogged down by the fear of impending nuclear war. Electrosculpture can give the spectator a glimpse of a possible future, where technology exists specifically for the enrichment of human life.

The presentation will be illustrated with slides and a 16mm film of the author's Electrosculpture.

PHOTOGRAPH CAPTIONS

Photo #1: Matrix, exhibited at the Mappin Art Gallery, Sheffield, England. 1974

Photo #2: Supellex Vox, (Furniture Voice) exhibited at the Arnolfini Gallery, Bristol, England. 1985

Photo #3: Great Alaskan Pipeline Organ, exhibited at New Music America Festival, Houston, Texas, U.S.A. 1988

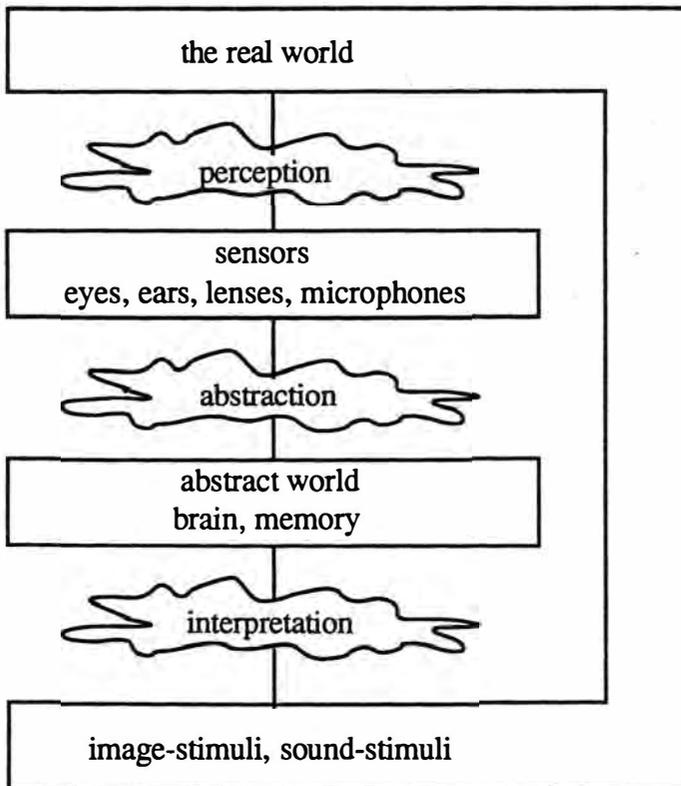


Diagram: The interaction between an abstract world and the real world.



REFLEXION OF SOUNDS AND IMAGES,

Berkel, Pierre van,

Independent Artist (allied to MonteVideo in Amsterdam, and Department of Computer Systems, FWI, University of Amsterdam),

Amsterdam,

THE NETHERLANDS.

Abstract

As the -indirect or direct- result of visual and aural stimuli (other stimuli are left aside) abstract worlds come into being in the artist's brain. To make these worlds, which, in this initial stage, do only reside in the brain, perceptible to others, an interpretation of them by means of sounds and/or images is required (see diagram). Here, the task of the artist is to find a balance between the abstract world and its interpretation, i.e. the abstract world should be 'mapped' onto real world objects like sounds, moving pictures on a screen or paint on a canvas. One might say, the artistic challenge lies within the field of tension between the real world and the abstract world.

Computers are very well equipped for storing abstract worlds. Broadly speaking, two types of abstract worlds can be distinguished: virtual worlds and the conceptual worlds. For a clear understanding of the concept 'virtual world', I want to refer to the paper of Timothy Binkley [1], in which it is described as a world defined by algorithms. The mathematical expressions describing these virtual worlds must be implemented into the computer. Conceptual worlds can be described by sets of concept denoters. As with mathematical expressions, these have to be implemented into the computer. Concept denoters that might be very suitable for this purpose are elements of the natural language, e.g. nouns [2].

A computer can be seen

as an extension of the artist's brain,
in combination with aural and visual sensors, as an extension of the artist's ability
to abstract from sound and images, and
as a device for the interpretation of abstract worlds.

A practical elaboration of this viewpoint is the SIAS-animation-system [3], developed by MonteVideo in collaboration with the University of Amsterdam. This system makes it possible to describe, on the one hand, virtual worlds and, on the other hand, their interpretation by means of 2D patterns (see picture) and sound.

References

1. Binkley, Timothy, 'The Wizard of Ethereal Pictures and Virtual Places', Leonardo, Computer Art in Context Supplemental Issue 1989, p. 19.
2. Berkel, Pierre van, 'The Metascript', 1990 (unpublished).
3. Berkel, Pierre van, 'SIAS, Strokes Interpreted Animated Sequences', Computer Graphics Forum 8 (1989), pp. 35-47.

MUSEUM TECHNOLOGY: LINKS TO CRITICAL PROBLEMS IN HYPERMEDIA COMPUTING

Search, Patricia

Rensselaer Polytechnic Institute

Troy, New York

USA

This presentation will discuss a university research project on contemporary art that is developing hardware and software solutions for critical problems in hypermedia computing, in particular, navigation and interface design, authoring languages, and database development. In addition, the project seeks to examine and further the relationship between the visual arts and computer science by investigating the role of hypermedia in art education.

Hypermedia is an important educational tool because people learn best when they can pursue areas of personal interest at individual levels of expertise. It is particularly suitable for researching and presenting information about contemporary art. The widespread use of photography and television in the twentieth century placed a strong emphasis on the visual documentation of historical and cultural events, and influenced the direction of art. A multimedia resource that combines text, still images, video, and audio information provides the most comprehensive platform for understanding the social and cultural influences of this period.

However, hypermedia programs that provide random access to large databases of information create new challenges for program designers and the end user. Navigation and interface design are critical issues because people become confused and disoriented when given the ability to browse through large amounts of data. This presentation will discuss problems in hypermedia computing and how the development of a hypermedia program on contemporary art may provide solutions to these problems. The highly conceptual and interdisciplinary nature of contemporary art, including electronic art, requires an understanding of how people use structural controls and visual references to make associations and navigate through a multimedia database. By evaluating hypermedia programs in the context of contemporary art, we can gain new insights into how to create navigational aids and screen designs that integrate the language of hypermedia (text, still images, motion video, sound) into an effective communication environment.

METHODS OF MUSIC VISUALIZATION

Bulat M. Galejev, PhD

'PROMETHEUS' Studio, Aircraft Engineering Institute
Kazan, U.S.S.R.

In the XX-th century means of audio-visual communication in art were considerably renewed. Before when man used only 'natural' means of communication, his functions were restricted to both set of instruments control and supply it with his own (mechanical) energy. Having mastering the audio-visual means of 'artificial origin' man became free from power functions for they were provided by external (electric) energy source. His actions at the moment were completely focused on the control only. In accord with it the flow diagram of an audio-visual system becomes more complicated. It includes a man (M) who acts as an operator in both light and music channels, control panel (CP), control unit (CU), power amplification unit (PAU) and output unit (OU). Analysis of possible interactions between the corresponding components of these channels reveals in principles of their synchronization the hierarchy as follows: 1) Physical sound visualization in OU (Lissajou's, Chladni's figures etc.); 2) Power amplification units (PAU) merging (the psychedelic light-music devices); 3) Automatic synthesis of light and music according to a definite program put in CU functions; 4) Synchronical music accompaniment with sound by means of CP; 5) Synthesis on the man level. Accordingly, the high artistic value extend is steadily growing, reaching in its limit the creature of the original light-music works by an artist-man who can just use audio-visual polyphony ways for it.

The 'PROMETHEUS' Studio has experimented on all the basic music visualization methods. This experience showed that the 1-st method was efficient in musical acoustics researches, the 2-nd and 3-d - in shows of entertainment, in discotheques etc., the 4-th - in making light-music programs of pedagogical purposes. But only 5-th method proves its value in art in creating of original light-music works.

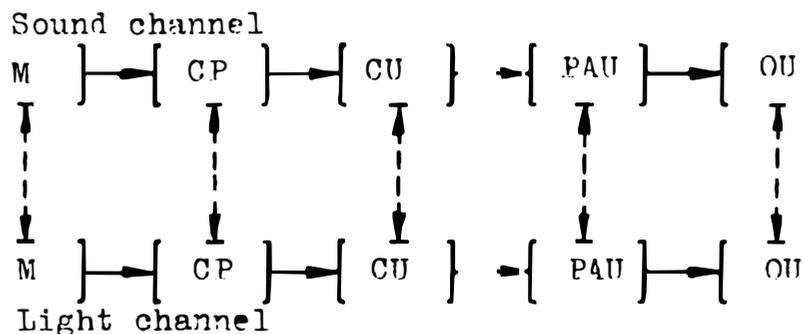


Fig. Audiovisual System Flow Diagram

THE DEVELOPMENT OF THE VIDEO CONSTRUCT

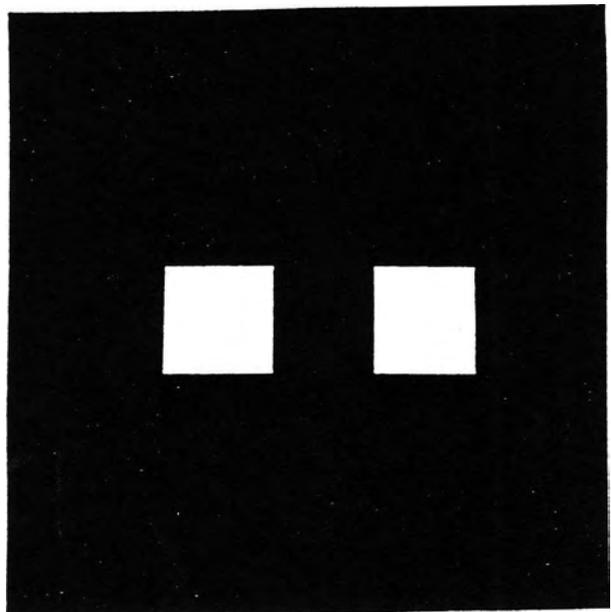
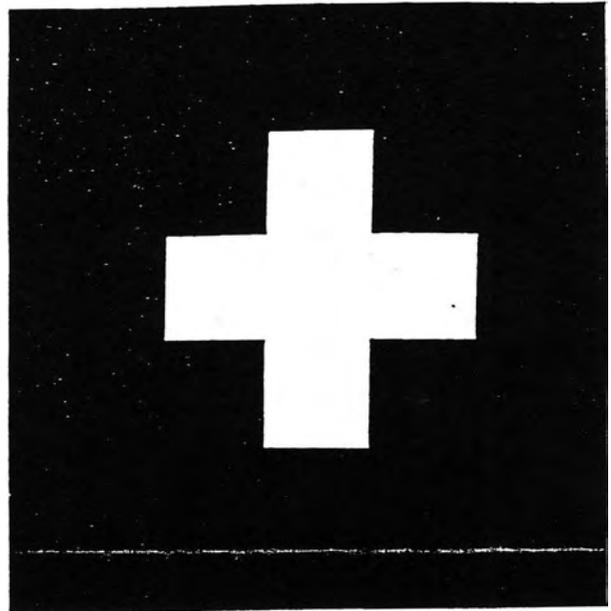
Edmonds Ernest

LUTCHI Research Centre, Loughborough University of Technology
Loughborough, Leicestershire
UK

A video construct is an abstract animated video sequence controlled by, and generated from, a computer system. The way in which logic is employed in them was described at the FISEA and the paper published in Leonardo. This paper traces their development from the first one exhibited (London, 1985), through the one shown during the presentation at FISEA to the first colour video construct, shown in London 1989 and later ones shown at the World Trade Centre Rotterdam, 1989, and to be shown at Heads and Legs, Liège, and at the Menage, Moscow, in 1990.

The significant developments that will form the centre of the paper are concerned with the addition of musical performance and interaction. The author is collaborating with musicians to develop live musical/video construct performances that include the use of electronic music. The first such piece will be performed at the Liège exhibition and another is proposed for SISEA (see the separate proposal). In parallel with this development is a project to investigate video constructs through which small groups of people can 'communicate' (see Leonardo, vol 3 No 8, 1975 for the original ideas employed here). The project will be realised, in the first instance, at the Museum of Modern Art, Oxford, in 1990.

The presentation will be illustrated with video sequences.



CECI N'EST PAS UN OISEAU (DOCUMENTARY VIDEO)

Penny, Simon

Electronic Intermedia program, Dept of Art, University of Florida.

Gainesville.

USA.

Ceci n'est pas un oiseau is a projection installation comprising a specially built animation projector and a system of four automated semi-transparent screens. The projector projects a looped series of images of a cockatoo in flight made by Edward Muybridge onto the four screens. The screens are moved by the action of six programmed, suspended fans.

The central concerns of the work are with:

:Human pattern recognition,

:The seduction of the cinema, behind which is a rigorous mechanics of sequenced still frames.

:The location of the sign in a chain of electro-mechanically reproduced signifiers,

:The rendering 'scientific' (thus 'knowable') of natural phenomena by the use of Cartesian, Empirical taxonomic systems. Muybridges' grand project was to quantify animal and human locomotion by the superimposition of it upon a planar grid and then to 'grid' time through the sequencing of the cameras. This procedure is a case study in the method of the 'old science' which traces its lineage through Euclid, Descartes and Newton, of a world resolvable to simplified relationships and excluded variables, where time and space are absolutes. The project is conceptually contemporary with Mendeleyevs' periodic table of elements and Mendels genetics.

The projector is a non-standard application of stepping motor technology. It is built almost entirely of recycled components. When the projector was nearly completed I learned that Muybridge had built a projector for his images based on the same disc concept.

ART ON CD ROMS; THE CUTTING EDGE

Haveman, Josepha

A/PIX computer art center, Berkeley
& Dept. of Communications Technology, City College of San Francisco
U.S.A.

Computer graphics have thusfar been difficult to distribute in any quantity, due to the fact that graphics files require considerably more digital storage space than other datatypes. CD ROMs, which are optical discs, and identical to the better known music CDs, now represent the newest storage technology for personal computers. Since one such 'compact disc' can hold the equivalent of more than 600 800K floppy disks, and weighs less than one single one of those 3.5 inch floppies, it is a very attractive distribution medium for large volumes of digital art.

Theoretically any art collection that is too large to fit on, let's say, ten floppy disks, would be a candidate for transfer to a CD ROM, but from a practical point of view, the current production costs dictate that in order to viably market such a disc, each CD volume should hold at least 100 megabytes of material; preferably more, depending on the type of files. I found, ---even after my nearly ten years' experience with personal computer graphics --- that when producing, and managing, enough art for such a huge volume, my apprentices and I encountered a number of interesting and challenging problems. Most of these problems could have been solved quite easily by a large company with access to plenty of trained personnel and a comfortably large production budget. But the challenge of *personal* computing means that we keep it personal, and so we go it alone!

Other individualistic artists looking toward the expanding options of future media, might benefit from sharing in our experiences.

If adequate equipment is available for a demonstration, I will show pictures and other aspects of our first CD, discuss some of the main production problems, and make suggestions for equipment selection and production procedures. Then I'd like us to speculate on the future of digital art, and on the various new options we now have, for taking advantage of this voluminous new distribution medium.

I believe that once the production obstacles are overcome, CD ROM is a great way to project the arts out into the world!

"PROSTHETICS, ROBOTICS AND REMOTE EXISTENCE:
POST-EVOLUTIONARY STRATEGIES"

Stelarc

Visual and Performing Arts - Ballarat University College
Ballarat
AUSTRALIA

Prosthetic replacements and orthotic augmentation require the design of technological appendages that function interactively with the body. The Hitachi Hand with shape memory alloy (Nitinol) tendons and the ACFAS arm with pneumatic muscles actuators, function like human anatomy and result in soft and flexible yet stronger mechanisms. What is important is not merely to maintain the body's performance but to consider ways of increasing its capabilities. Exoskeletons worn by the body amplify its physical power. Extenders (Kazerooni), are not mere master-slave mechanisms. They provide intimate operator-machine interaction allowing manipulation of objects with greater maneuverability, speed and feel.

What is now significant is the projection of human presence and the amplification of human action to remote and even extraterrestrial locations with Teleoperation systems. A single operator could direct a colony of robots in different locations or scattered human experts might collectively control a particular remote robot. Teleoperation systems would have to be more than hand-eye mechanisms. They would have to create kinesthetic feel, providing the sensation of orientation, motion and body tension. Robots would have to be semi-autonomous, capable of intelligent disobedience. With Teleautomation (Conway/Volz/Walker) forward simulation, with time and position clutches, assist in overcoming the problem of real-time delays allowing prediction to improve performance. The experience of Telepresence (Minsky) becomes the high-fidelity illusion of Teleexistence (Tachi).

Electronic space becomes a medium of action rather than information. It meshes the body with its machines in ever-increasing complexity and interactiveness. The circuitry of cyberspace hard-wires the body to technology and contours its behaviour. With the possibility of technological appendages, implanted components and remote surrogate robots, the body's functions are enhanced and its form is extended. Its performance parameters are neither limited by its physiology nor its immediate space. Electronic space restructures the body's architecture and multiplies its operational possibilities.

THINKING OF ONESELF AS A COMPUTER

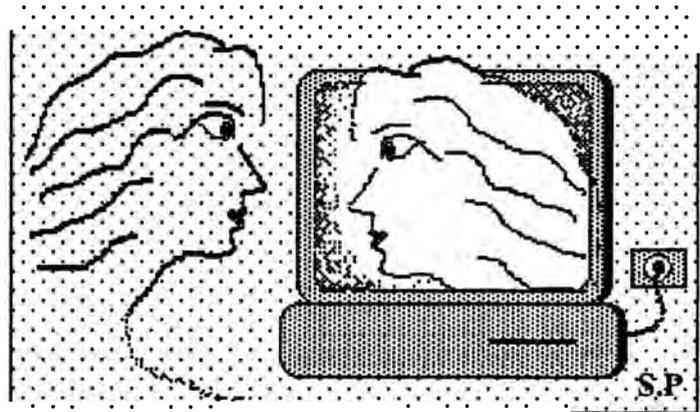
Pryor, Sally

Lecturer and Artist

University of Technology, Sydney

AUSTRALIA

Throughout history, the metaphor for the self echoes the latest technological advances. Today, as the boundary blurs between technology and the body, people seem to be shifting almost unconsciously from a mechanical model of themselves to one based on the computer.



I notice this initially amongst scientific and technical people: references to the 'wiring diagram' of the brain or to information supposedly 'hardwired' in DNA. An extreme example occurred when a fellow computer programmer was telling me once that he was feeling off-colour: "my software's OK but I think my hardware has problems."

People are starting to talk about themselves as if they were computers at the same time as computers are being designed to model human skills. But what of the human-computer relationship? As an avid computer artist/ animator/ programmer since the early 80's, a bout of RSI (Repetitive Strain Injury) last year encouraged me to think about the distinct lack of corporeality in this 'relationship'.

The idea that people are like information processing machines, that is computers composed of software and hardware, seems to assume a Cartesian mind/body dualism. This dualism is associated with other supposedly mutually exclusive pairs (such as subject/object, self/other, reason/emotion, masculine/feminine and culture/nature etc) in which the attributes of one term are seen as incompatible with the attributes of the other.

This idea is explored with reference to:

- 1) the notion of the rational, disembodied subjectivity inherent in science and technology
- 2) the idea that patriarchal oppression justifies itself through the presumption that women more than men are tied to their fixed corporeality
- 3) Descartes' personal interest in automata
- 4) the concepts of artificial 'intelligence', the cyborg (a hybrid of machine and organism) and virtual space (a 'world' created and mediated via the computer)

Seen in parallel with developments in medicine, genetic engineering and reproductive technology, the theme that emerges for me is a quest to focus on certain kinds of intelligence and to control and/or make redundant those aspects of ourselves that are associated with the body and animalism. This goal and its desirability is examined from a feminist and artistic perspective.

REGION

Wallace Linda
Artist
Melbourne
AUSTRALIA

REGION will consist of a body of researched text accompanied by video imagery.

The central ideas is:- the changing nature of subjectivity and identity in Australia, as seen through the screen of both technological advances and a *will* (economic, political, social and I believe spiritual) towards regionalism, i.e. AustralASIA.

My work in the past has been narrative based, specific to the broad notion of how the individual subject maintains itself as coherent and *evolving* over time, and in relation to others.

This is given added texture from various technological processes. Indeed, past work has used different 'mediums' of representaton eg film, video and sound, almost as characters (in as much as they possess "traits") to add another layer to the narrative.

This imperative is exacerbated by the pure rate of technological change. How will the human animal adapt, incorporate and evolve to suit this new techno-coded space?

Australia feels itself to be fast becoming a part of the greater Asian region - a region where many of the world's technology leaders are found. Given our historic and geographic circumstance Australia is placed to be the link between Europe and Asia, as the whole world moves towards increased globalisation.

REGION addresses the implications of this trajectory, making particular reference to the implications for art practice.

I envisage that as a consequence of the research and development the presentation would be something akin to a performance, with a video interface created from footage shot both in Asia and Australia.

SISEA ABSTRACTS

TISEA PRESENTATION

Barratt, Virginia

Executive Officer, Australian Network for Art & Technology

Adelaide

AUSTRALIA

Australia's proposal for the Third International Symposium on Electronic Art in 1992.

The proposal will outline the aims and objectives, rationale and format of TISEA, as proposed by a number of Australian organisations involved in Art and Technology, and will be presented by the Australian Network for Art and Technology, who are the proposed co-ordinators of TISEA.

A major focus of the proposal will be COMMUNICATIONS.



UNIVERSITA DEGLI STUDI DI MILANO

Dipartimento di Scienze della Informazione

Scientific Committee of ISEA
SISEA Secretariat
Westerhavenstraat 13
9718 AJ Groningen
Holland

Milan, October 16, 1990

Dear Sirs,

I declare my aim to explore the possibility of organizing the FISEA in Milan, either in 1993 or in 1994 depending on both your and my constraints.

A further possibility may be to join the FISEA with the X Colloquium on Musical Informatics which is already scheduled for the fall of 1993. To do that I think that it is necessary to define an agreement among your organization, the Associazione di Informatica Musicale Italiana (A.I.M.I.) and my Dept. I hope that you will consider this chance.

Please, if you are interested in this opportunity, let me know all the organizing aspects involved.

Thank you in advance for your attention.

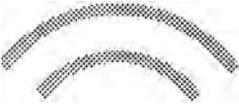
Best regards

Goffredo Haus, L.I.M. Scientific Director
L.I.M. - Laboratorio di Informatica Musicale
Dipartimento di Scienze dell'Informazione
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Exhibition catalogue





Exhibition



Electronic **Art**

During the SISEA symposium, on the 14th, 15th and 16th of November a special Electronic Art Exhibition is on display in the hall at the symposium location (De Oosterpoort). A jury consisting of members of the program committee and faculty members of both SCAN and the Department of Visual Arts, Music and Architecture of Groningen Polytechnic, have selected the best artworks from over 300 entries. The entries were sent to SISEA by individual artists as well as a large number of institutes from all over the world.

Proposals were welcomed for videotapes, slides, prints and (interactive) installations. The final exhibition contains three video stand-alone units, a slideshow, computer graphics reproduced in prints, mixed-media works and a number of installations, some interactive (i.e. responsive to the viewer).

Part of the exhibition has been provided by Siemens Germany and Ars Electronica. It shows the recent prize winning material of the annual Ars Electronica festival in Austria. Furthermore there is a contribution from the Institut National de l'Ausiovisuel (INA), France in cooperation with the Centre Culturel Français in Groningen. Also included in the exhibition is work from a touring computer art exhibition provided by La Cité des Arts et des Nouvelles Technologies from Montreal Canada. Special support from the Canadian government made it possible to present three installations from the artists Nancy Paterson, Doug Back and David Rokeby.

The Free Screening Room is located downstairs, accessible from within the exhibition space. The Free Screening Room provides an overview of the entries for the SISEA exhibition that were documented by slides or tapes. Slides will be on display continuously, and tapes can be played on request.

The exhibition catalogue consists of short statements on their work by the artists participating in the SISEA exhibition. These statements can be found on the following pages. Along with the statements a special, low priced slide set has been compiled as a documentation of part of the SISEA exhibition. This slide set can be ordered at the registration desk. A sample set is also available there.

The exhibition has not been limited to certain pre-established categories (computer graphics, animation, etc..), but presents an interesting view of the many ways in which electronic technology is used for artistic purposes. It reflects the diverse nature of the electronic art landscape that is studied at the SISEA symposium.



Exhibition



Electronic **Art**

November 14 - 16

Time 10.00 - 17.00 hrs and 19.00 - 22.00 hrs

Cultural Center de Oosterpoort

Palmslag 10, Groningen.

Catalogue design

Marc Lubbers, *Editor*: Eric Kluitenberg

Exhibition design

Astrid Knol, Sharon Nijboer, Erwin van der Sluis, Gert Jan Bok.

Coordination

Eric Kluitenberg, Ben Remkes.

Special thanks to

Gerrit Velthuis, Ebe Treffers en Simon Biggs.

Deze tentoonstelling is mede tot stand gekomen dankzij de medewerking van:

Siemens Kulturprogramm / Ars Electronica, VB Visual Design Groningen, Sector kunstvakopleidingen "Academie Minerva", Eringa Professioneel, Institut National de l'Audiovisuel (INA), Centre Culturel Français, Ministerie van WVC, Stichting Publieksvoorlichting voor Wetenschap en Techniek (PWT), Prins Bernhard Fonds, Gemeente en Provincie Groningen, Scholtenfonds, A Space Toronto, Air Canada, Arts Promotion Division, External Affairs and International Trade Canada, Ministry of Culture & Communications Canada, Government of Ontario, La Cité des Arts et des Nouvelles Technologies de Montreal.

In cooperation with SISEA:

Exhibition Interactions

November 18 - December 9

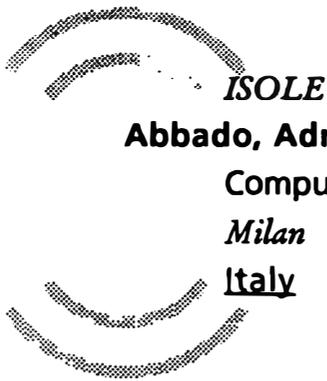
An international selection of interactive art
by 7 artists.

Rijksmuseum Twenthe, Lasondersingel

129-131, Enschedé.

Time: Mo - Fri: 10.00 - 17.00 hrs

Sa / Sun: 13.00 - 17.00 hrs



ISOLE

Abbado, Adriano

Computer Images & Music

Milan

Italy

ISOLE

In this film, several abstract objects are related to each other, creating a dynamic counterpoint between the different parts. This film has been made by recording the animations that were produced in real-time by software AV, running on a Macintosh II. Real-time animation has permitted easy editing and immediate modifications before filming, allowing the author to try different solutions and therefore to reach more easily his goal.

Animation Adriano Abbado and Dagmar Trink.

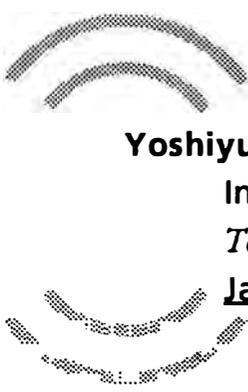
Software Adriano Abbado in THINK's LightspeedC

Hardware Apple Macintosh II, Apple Color Card,
Apple Color Monitor.

rt ts Statements

Film & Video Show





Yoshiyuki Abe

Independent Artist

Tokyo

Japan

The raytraced scene(s) was (were) processed by a homebrew machine and original software. Bump mapping and texture mapping on the sliced parahyperboloid surfaces. The images have a resolution of 2048 * 1536 and 24 bit colors.

Computer images generated by mathematical process introduce us to the world we have never seen. The images are not reproductions of our real world, but actually exist in the world. As telescopes and microscopes extended our aural and vocal powers, computer graphics provides the perceptual breakthrough. For myself, computer is not a painting/drawing brush but the image generator. That is why I am using only math based programs.

Art sts Statements

Exhibition





IN THE WELL

Peter D'Agostino

Temple University



In the Well (peephole) is from a series called "TransmissionS", a body of work forming a metaphorical history of the electronic age.

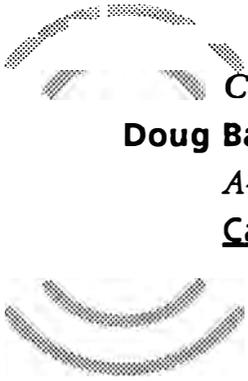
This entire interactive installation is conceived as an enclosed symbolic space to enshrine or entomb an almost fable-like tale of a boy who falls into a well. The actual story gained international prominence when it was broadcast live all through the night on Italian television. The boy's parents were joined by the president and the army in the futile attempt to save him. But all the king's men and the efforts of the media appeared to have been in vain when the boy died in the well.

The installation explores a number of universal themes: myths of falling (Icarus) and of the underworld (Orpheus); stories of Mother Earth and emergence, re-birth and resurrection.

The mediation of the tale through television, and in this case the interactive videodisc installation is crucial to the re-telling of the story. The viewer is now a participant in the story, an interactor, able to intervene in the tale from different physical and metaphorical viewpoints. Contained in a closed kiva-like circular space are several mechanisms, including a peep hole and an interactive touch screen, which provide insights into the piece.

"The Peephole" contains an image of the Well and a reflexive eye gazing back at the viewer. The Renaissance space, of perspective and of the camera obscura has obvious references to Duchamp's "Etant donnés". But the image the viewer sees, from inside the closed gate, is from Piranesi's garden at the "Knights of Malta", in Rome which frames a view of Michelangelo's dome of St. Peter's in perfect one-point perspective. This garden like the scene in "Etant donnés" is physically inaccessible and can only be viewed through a peep-hole. "The Peephole" segment serves as a commentary to question the notions of "interactivity" and "intervention" in the age of electronic transmission

Video/sound/editing: Peter d'Agostino; music: Jon Gibson
videodisc consultant: Ken Shannon



Computers + Video = New art from Canada

Doug Back, Nancy Paterson;

A-Space, Toronto,

Canada

Doug Back

Jacob Wrestling with the Angel

This piece consists of a video camera attached to a motorized camera mount, a video monitor and eight objects arranged in a semi-circle around the camera. The motor can rotate the camera around a room similar to a surveillance camera. The motorized camera is in the centre of the room and is surrounded by objects in a semi-circle. As the camera pans around the room, the motor pauses the camera as it points at each object. The objects are recorded on videotape along with audio tones which start and stop the motor. On play-back the electronics and motors pan the camera around the room exactly as it did while the objects were being recorded, stopping the camera at each object. To the viewer it appears that the camera is "looking" at each object and displaying them up on the video monitor.

However the camera is no longer on. The video monitor is showing pre-recorded images. The objects all have changed over time. The monitor shows fresh flowers - on the floor lie wilted flowers, the monitor shows a block of ice in a pan - on the floor there is now a pan of water, etc.

Nancy Paterson

Hair Salon TV

This installation is a multiple monitor video installation in which computer-controlled imagery is juxtaposed to reveal the diverse roles which women occupy within our high-tech culture. The chrome helmets of the three women's hairstyling chairs are fitted with 11 inch colour monitors. The imagery shown is taken from a variety of sources including broadcast television and original footage. Imagery is divided into three thematic areas: women and domestic technology - for housework, beauty and fashion; women and technology in the workplace; and the role of women in scientific research and technological development. Depending on the particular interval pattern selected by the computer, imagery may appear different (or the same) on all 3 monitors, or in various combinations of two the same and one different. Juxtaposition of imagery demonstrates myth and ideology stretched to reveal the irony of women's expectations of technological developments. HAIR SALON TV counters the optimism and passive acceptance which women are expected to feel towards technology with the real impact it has had on their lives.

Artists Statements



CENTRE COPIE ART
Montreal
Canada

Phillipe Boissonnet

Interference no.1, 1990

thermo-digital transfer and collage on canvas

Jacques Charbonneau

Warriors, 1990

Infographie mounted on aluminium

Marvin Gasoi

Light Object, 1988

digital thermal copy on paper

Georg Mühleck

Fast forward, african sculpture serie (excerpt), 1988

Videographie (digital thermal) on paper, mounted on aluminium

Sylvie Readman

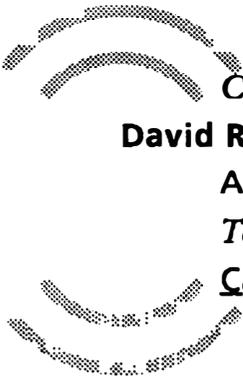
La main actant, 1988

digital thermal copy on paper

Art sts St tements

Exhibition





Computers + Video = New art from Canada

David Rokeby;

A-Space

Toronto

Canada

David Rokeby

Very Nervous System

The installation is arranged so that three low resolution video cameras positioned at the vertices of a triangle, relay information about what is happening within their field of vision to a control system which includes a custom-made fast processor, sound synthesizer and specially designed software. The computer processor receives information from the cameras and translates this information into sound. The software is designed to detect the location of people, how much of their body is in motion, the relative intensity, suddenness or continuity of their movements and the locations of the greatest activity. The volume and instrumentation of the sounds which are produced are directly related to how the subject within the sculpture moves. Simultaneous feedback, made possible by microelectronics, creates an atmosphere in which sound and motion conspire to create a cybernetic circle.

Art sts Statements

Exhibition





THE TEMPTATION OF SAINT ANTHONY

Simon Biggs

Center for Advanced Studies in
Computer Aided Art and Design
Middlesex Polytechnic



London
U.K.

“The Temptation of Saint Anthony”, a new video by Simon Biggs, has been inspired by Gustav Flaubert’s verse-novel and Heironymous Bosch’s painting, both of the same title. The video relates an allegorical scenario based on the story of the fourth century Egyptian desert-living hermit, battling his fears and desires with his faith in a deeper order - his greatest fear being that this order was the source of his problems. In “The Temptation of Saint Anthony” the world is a hybrid between the natural and the manufactured with deserts inhabited by creatures composed from human anatomy and machine parts, trees growing out of massive industrial fragments, laboratory equipment twisting itself into organic forms and vulcano’s giving birth to and consuming mysterious devices of uncertain function. It is a universe of deranged inventions where it is impossible to differentiate between the natural and the unnatural, the living and the dead.

“The Temptation of Saint Anthony” is a visually rich poetic narrative, entirely synthetic in its making. State-of the-Art computer graphics and digital-video editing technology was employed to create the objects that inhabit this world, where landscapes are manipulated into other forms and fragments of technology and anatomy are welded together into wild hybrids. The very medium of its creation, the computer, is one of its primary references, along with the impact of other new technologies such as genetics and telecommunications. This work seeks not to extricate itself from the social and environmental problems of rapidly developing technologies, but implicates itself and the role of the artist and the viewer in this process. Art itself is seen as a technology beyond the control of a humanity unable to abstain from indulging such primary drives.

The temptation of Saint Anthony is the third in a series of works by the artist - all dealing with the relationship between humanity, technology and the world and vision it shapes - starting with the computer-video installation Golum, 1988 (with sound-installation by Hans Peter Kühn) followed by the digital video A New Life, 1989 (original music by Jon Rose). A fourth piece in this body of work, Alchemy (an interactive multi-laser-disc installation), is currently in production.



A NEW LIFE

Simon Biggs

Center for Advanced Studies in
Computer Aided Art and Design
Middlesex Polytechnic



London

U.K.

"A New Life" is a digitally produced videotape loosely based around Dante's first novel "The New Life". In addition it draws upon a number of works by the early Renaissance Italian Painter Mantegna. It was produced using a Spaceward Supernova computer graphics system and high-band digital editing. The music was composed during production by Jon Rose (Amsterdam) using digital synthesis and sampling techniques. Although involving advanced technology in the creation of "A New Life", the production techniques are not dissimilar to much traditional animation. The work may be regarded as one more of the following - video art, animation, computer graphics or simply a pictorial narrative.

Using cut and paste, 3-D graphics and editing facilities that are now available with computer technology, the works of Mantegna are recomposed and montaged, elements from one painting naturally reappearing in another, creating new "Mantegna's" which are then integrated with entirely synthetic imagery.

"A New Life" is composed relative not only to Dante, but also seeks to place video as a book-like artifact itself. That is, not an object that looks like a book but which 'reads' like one. A beauty of video is the control the viewer has over its display - the facility to 'time-shift', much as in reading a book, by freeze-framing and reviewing. As a short work "A New Life" is conceived as a piece that the 'reader' can return to on numerous occasions, as if it were a short story or poem.

It is partly the author's concern that video is a medium distinct from other time-based visual media (cinema or television) and that it is this book-like quality which lends the medium some of its unique value. "A New Life" should ideally be seen in the home, on domestic equipment, rather than in a videotek or on broadcast television.

Video by Simon Biggs

Music by Jon Rose

Art sts tate ments

Exhibition





OREN VAN JE KOP (LEADER)

Paul Bloemers

Rotterdam

Netherlands



Paul Bloemers is a Rotterdam based independent designer and has been working on television graphics and animation since 1986. Depending on requirements and possibilities, he uses a variety of systems from low cost (Amiga, Macintosh) to high end. He expects computer animation to become better and cheaper when most of the work (design and modelling) is prepared on smaller machines before going, for the final calculations, to more powerful computers.

Exchangability is of prime importance in this case; as far as 3D animation concerns, RenderMan would qualify for becoming a good standard.

The leader of the children's programme "Oren van je kop" was made without RenderMan, on a Dynagraphics DP 4:2:2 and was commissioned by KRO television. Music is by Rens Machiels



SITY SAVVY

John Chadwick and Don Stredney

Advanced Computing Center for the Arts and Design

Ohio State University

Columbus, Ohio

U.S.A.



Sity Savvy presents a young prepubescent punk, Bragger T.Bones, expressing his violent distaste for the right wing mentality and the absurd proposition of censoring art. This film demonstrates the critter character animation research, which adopts a layered approach for creating motion with personality, and the film attempts to carry this layered approach through the expression of the piece as well.

Art sts Statements

Exhibition





Mohammed Aziz Chafchaoui

Independent Artist

Cassablanca

Maroc



Today the “potentials” of computation and communication technologies progressively leads to interaction, simulation and visualization of the deepest levels of human thoughts and its multidimensional universe scenarios.

As soon as it is question of examining the essential nature of phenomena -the deepest stratum of matter in physics, the profound states of consciousness in spirituality and art- only the organic, dynamic and indivisible vision can grasp the multidimensions of complex reality.

Now that the human mind is becoming as transparent as the observable micro and macro levels of reality, and now that we have tools to explore more with less (all gamuts of technologies: from satellites to robots to symbolic system means), Art will be the medium of infinite dimensions of Unity:

- As an indicator of physical and metaphysical processes of esthetic problem solving.
- As a translator of universal generalized principles into concrete processes of the illumination of self and others. “As above, as below” or $E=mc_2$ will be the code of tomorrow’s art.
- Art as an interface between universal achievements throughout space-time and personal/collective applications of those achievements at all levels of life quality and communication.

Art sts Statements

Exhibition **SISEA**





Char Davies

SOFTIMAGE

Montréal

Canada

The images Vessel, Blooming and Leaf, Light, are part of an ongoing series entitled Interior Bodies, depicting subjective interior realities of organic phenomena. Vessel Blooming represents internal bodily processes of blossom and flesh: Leaf, light depicts the interior space of a leaf during the process of photosynthesis. Each image is a single 'frame' of a three-dimensional temporal world, and was created interactively with the 3D computer-animation software Softimage, on a Silicon Graphics workstation.

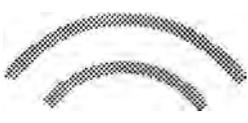
3D computer technology provides me as an artist with an expanded visual language encompassing aspects of painting, sculpture, filmmaking and set design. My interest in this technology as a painter and filmmaker was initially based on a desire to go beyond the picture plane and create within a three-dimensional space. The technology itself is very seductive, perhaps because it denies physical presence and allows the human mind to create in a virtual world where the body cannot enter...

In its ability to simulate, computer technology is separating us even further from direct experience of the natural world. Inherent in the technology (as product of the Western scientific/dualistic tradition which seeks to subjugate the world for human use) are certain value-laden conventions such as Cartesian space, linear perspective, and 'objective' realism, all of which serve to reinforce the Western worldview. For me, the challenges of working with this technology include attempting to circumvent these conventions and the ideology behind them, as well as searching for compensatory means to reaffirm the presence of the organic, of the many-layered subjective realities in ourselves and the other forms through which life flows around us.

I do not believe that computers have lead us into a disembodied future on a desecrated planet: this technology, with its ever-increasing visualization capabilities has the potential to help us develop a more holistic, integrative understanding of the world and our place within it. (Sometimes I wonder dreaming at night of pixel-edged images forming scan-line by scan-line while the computer renders delicately veined tissue, if the creative collaboration of mind and machine, carbon and silicon, is part of some slow vast evolution we cannot imagine....)

Art sts Statements

Exhibition **SISEA**



Prof. Dr. Hans E. Dehlinger

Gesamthochschule Kassel, Fachbereich Produkt-Design

Kassel

Federal Republic of Germany

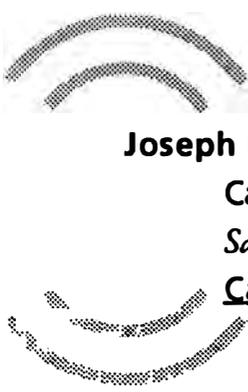


Line Drawings constitute a universe of their own. To draw lines is a most natural thing for an artist. The “resistance of the material” is for a hand drawn line very low, for a line drawn with a computer much higher. To realize an idea one has to write a program which then becomes the instrument for the generation of the drawing. One of the fascinating aspects of computer generated line drawings is the possibility to work with sequences and produce variations on a theme very easily. The lines are generated by a parameter-driven algorithm which draws on random processes.

Art sts Statements

Exhibition





Joseph Delappe
Cadre Institute
San Jose
California

About "Victimless" and "Hand Above":

This work is about changing channels; creating new contexts for moving images. To impose an order upon the chaos of visual information we are subject to through the media and everyday living. The result being imagery that conveys a personal point of view from selective input.

The images were initially taken from random videotape recordings of broadcast television and the intentional use of videocorder. The computer was used to "grab" individual frames of video which were then manipulated, photographed, and re-assembled. The complete images were incorporated into two distinct installations, "Changing Channels" and "Adam and Eve".

I am currently working on an interactive installation incorporating electronic sculpture, text and images, a personal computer and office furniture. This piece shall complete my Masters of Fine Arts Degree at San Jose State University's CADRE Institute.



Arthur Elsenaar

Department of Visual Arts, Academy Minerva

Groningen

Netherlands



"Leaves"

Goal: This work illustrates the relationship Man/Nature. Through human interventions (environmental pollution) nature is violated, it recedes if approached and, frightened, starts to shake. The use of electronic technology in this installation is inherent to the pollution. The pleasure derived from it by the viewer is therefore also a warning.

Method: In my latest work there is a consequent appearance of a participant. This is not as much a conscious choice, as it is a logical consequence of my perception of reality.



James Faure Walker

Royal College of Art

London

U.K.

What's most interesting about using a computer in painting ?

.... The way it infects the creative process. I use computers to play around with visual ideas. I like the immediacy of colour control. I find when I return to 'wet' media my mind is still thinking with that flow, and visual freedom... there is no limit, it seems every image can be re-processed, re-collaged...everything is possible. Paint on the computer is simulation, and in that sense unreal, but painting proper is full of techniques that in comparison feel unnatural - you can't change colour in real time, make fills, and so on... and the brush, palette, canvas arrangement is cumbersome. But resistance helps too. The physical inertia of painting. The way it absorbs time.

My feeling is that it's a mistake always to consider the computer in isolation, to look in a rather exclusive way for 'computer art', to talk of 'computer generated art'. There's always someone who set things up, made choices, exercised their taste. (There's also a whole artworld, which at least goes through the motions of intellectual discourse, that hasn't as yet woken up to the potential of computers - probably because computer art has such a dreadful reputation.) In my case I'm developing, and I hope enhancing, visual forms that have been with me quite a while. I use computer print as a medium in its own right. It gets me improvising. Painters tend to be too deliberate, to talk ideas to death. There's a spontaneity in computing, maybe just to do with speed of thought. One thing I like about teaching computing is that the fine art/design distinction falls away. You're dealing with degrees of creativity. I can feel connected to car design, graphics, TV, advertising.... It's useful to see painting as just a visual medium, not some God-given art form.



Carol Flax

Independent Artist

Los Angeles, California

U.S.A.



I began this work at a time when I was attempting to reconcile being an artist with also being a mother of teenage daughters. It quickly became obvious to me that the computer was the perfect medium for dealing with the issues inherent in this reconciliation both conceptually and visually. The textures, repetition and layering of life are perfectly imitated by the computer. Reality is mirrored, at the same time it is altered, our assumptions questioned.

As I tested the limits of this new medium, I also tested the boundaries of bringing my relationship with my children to my art. While examining issues of parent/child. I have felt more and more the need to look in the other direction at my own history. I have extended my work to include family snapshots and other found images. The work now extends many years, covering four generations of family.

This work is created with a TARGA 16 computer graphics board using TPS software on an IBM compatible AT computer. I begin with various types of input, ranging from live video, to tape, to photographs, to found objects. As I gather visual, audio and other materials in life I store them away, knowing at some point they could end up as a part of my art. The computer is the perfect medium for this method of working, allowing for random input and integrated output. My final images are high resolution ink jet prints on 24*30 or 30*40 paper.

Ar sts Statements

Exhibition





Martijn Hage
Independent Artist
Lelystad
Netherlands



The inspiration for my graphics is often based on symbolic events in a historical background such as cult, myth or anecdote.

I built up an imaginary world shown from an ironical point of view.

The computer as a tool gives me the possibility to intervene in the creative process at any time I like, for example to choose or to change colours or go back to previous steps in building up an image.



Lane Hall

Independent Artist

Madison

U.S.A.



I take apart old books, and use their pages to superimpose other printmaking processes, combining old, original information from the book with new information of my own. I then rebind them, so that they look like “real” library books. These books become kind of a Trojan Horse of the art world; a viewer might pick one and begin to browse, not knowing that it was “art” until well in the sequence. I often use lithography, etching, relief printing, and typography; and combine these media with computer printing. Computer technology allows me a layering of imagery and marking, as well as a more transparent metaphor of time, visible through the “stacking” of technologies (new printing on old pages...). The computer “look” gives this layering of history a contemporary voice.

I have chosen to work in the format of books, because it affords a kind of interactivity and sequential building of imagery, yet retains a real “object” quality. The visual qualities of the layering of imagery and characteristic print technologies give the viewer a rich and compelling object to contemplate. The status between “found object” and “made object” becomes hazy, and the provenance of these books becomes a bit of a mystery. Science is alluded to, but the science seems exotic or outdated. I encourage the participation of viewers with all my books: they are made to be seen sequentially, not just viewed as prints.

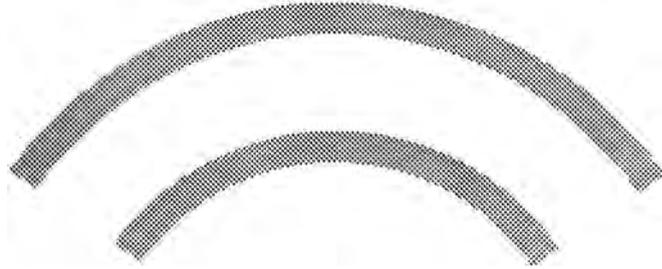
Art sts Statements

Exhibition





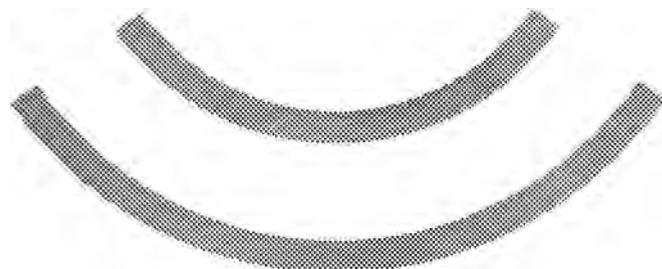
Jean-Pierre Hébert
Independent Artist
Santa Barbara, California
U.S.A.

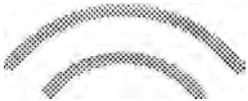


*“a few drawings,
mere ‘restes d’encre’,*

*each, a single
line on a sheet of paper,*

*each, countless
& invisible
lines of code in a computer”*





Mike King

City of London Polytechnic

London

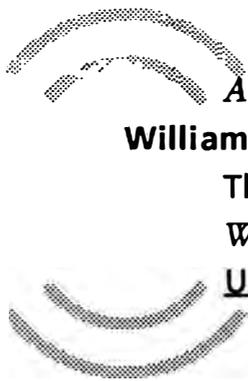
U.K.



I have been involved in the use of computers in fine art for about six years, and write software for my own and other artists' use, and run classes in the subject (at the City of London Polytechnic). I have explored many aspects of the medium, concentrating on static images for the time being. I think that the visual possibilities of the new medium are only beginning to be realised, and I am convinced that computers will have in the long term a significant impact both on the way that artists work, and in the visual language they employ.

In my latest series I have been exploring some of the problems of producing expressive imagery with 3D software: many systems that artists use originate from engineering applications and can limit expressivity. By building my own more organic-based modeller and placing the rendered 3D images in specially-generated backgrounds I can begin to make a more personal statement, and am able to explore abstract meanings within the language of 3D volume, weight and juxtaposition. I have always been interested in the effect on one of the presence and distribution of large volumes such as building, trees and mountains. For example, when a building or tree disappears in a familiar place, such as the street one lives in, one feels its absence in a curious way that is not just to do with spatial perception: it is an emotional thing, though a rather abstract one.

The 3D shapes are created by placing thousands of different-size spheres in space through the use of an interactive modelling package driven via a mouse. I can view the model from different positions and with different projections (from very close perspective to almost none at all) with a rather crude rendering. Once the set-up is decided on, the image is ray-traced (rendered) on a main-frame machine (usually overnight). The ray-tracing is interesting in itself: its use involves a lot of the considerations of a photographer, for example when photographing sculpture, in that different lights can be set up with different colours and intensities, which in turn may create shadows that may bring out or obscure aspects of the forms.



A SEQUENCE FROM THE EVOLUTION OF FORM

William Latham

The IBM UK Scientific Centre

Winchester

U.K.

"A Sequence from The Evolution of Form"

2.5 mins

Description.

A New computer art film by William Latham created at IBM UK Scientific Centre

The film shows the continual metamorphosis of a complex 3D form. A 3D form metamorphoses from a swirling random cloud of eggs and into starfish structure and then changes shape into a webbed plant form.

The film was produced using the WINSOM Solid Modelling Program and "Form Growing" programs written in the ESME language.

The film is of particular interest in that the key frames for the animation were created using a new "Evolutionary" Interface, which uses a combination of random mutation and artistic selection.

The moving forms are made to appear realistic by using 3D texturing, Ray Casting and multiple light sources.

The work is a result of creative collaboration between the artist William Latham and Scientists Stephen Todd and Peter Quarendon. Animation software by Mark Owen.

This film won first prize in the Research Category at "The Imagina Computer Graphics Conference 1990" in Monte Carlo.

The film opened the Film Theatre Show at "SIGGRAPH 1990" in Dallas U.S.A..

Technical Details:

Artist: William Latham

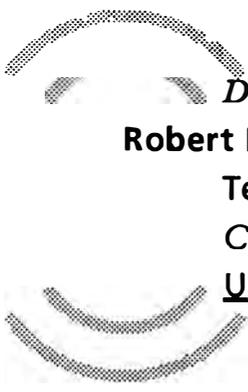
Graphics Software: Stephen Todd

Animation Software: Mark Owen and Richard Wilks

WINSOM software: Peter Quarendon

Hardware: IBM 3090, IBM 5080 Display

Software: WINSOM, ESME



DIRTY POWER

Robert Lurye

Texas A&M University

College Station, Texas,

U.S.A.

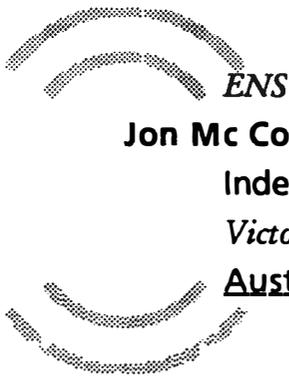
Dirty Power

"Dirty Power" is a work of personal expression which is in reaction to living in the age of the fatal disease AIDS. The work has obvious and ambiguous meanings which respond to events in my private and public life caused by our sexual-social crises. This piece was also inspired by my exploration of the often seductive sexy nature of three dimensional computer graphics media and its almost "magical" abilities. Previously I have worked with pencil drawing, photography and film, but having been seduced by three dimensional computer graphics, I have decided to use it as my medium of choice for this project. My personal approach to using the computer as a fine arts medium is the same as if I were using traditional media; the creative spirit comes from the same place no matter what I am creating or how I am creating it. However I am acutely aware of the unique capabilities of computers and try to make the best use of them as multi-media interactive environments/tools. I recognize every software package as an art medium. I am interested in working with programs written by others as well as writing my own. I have been fortunate to participate in transcontinental and intercontinental exchanges of images and text with fellow artists who create on the computer via BITNET and TELNET. We participate in critiquing each others animations, still imagery, software and literature. Thus, a big part of my approach to using computer as a fine arts medium is to use them to communicate with other artists as well as to use them to create art works that communicate with audiences.

Dirty Power begins with off screen sounds of lovers in the night and a television news broadcast. The sounds of the lovers brings to life the electrical cords and their plugs. The two cords unplug themselves engaging in a seductive gestural dance during which the viewer begins to suspect the motivation of each of the snake-like characters. It becomes clear that the unseen end of each of these cords is a television and a lamp. As the cords plug themselves in and out of the wall in love frenzy, the lamp and the television that they are connected to turn on and off. This cause and effect changes the lights and the sounds of the scene to the rhythm of the cord's intercourse. Meanwhile, the sounds of the lovers in the other room becomes increasingly more intense and mixed with progressively more ambiguous television babble. After the ritual comes to a climax the camera reveals the television and the lamp resting quietly on a living room table. The meanings attached to the interplay of the electrical cords are colored by the sound track. I am attempting to bring the feeling of life to inanimate objects while experimenting with cinematic language to intrigue, entertain, confuse and hopefully make people think.

Production notes:

This project served in part as a joint interpolation experiment with forward kinematics; an Evans & Sutherland PS300 and Twixt animation software written by Julian Gomez were employed. Articulated joints with a parent-child hierarchy were animated to command control-points for outputting three dimensional paths that were then referenced to generate three-dimensional tubular geometric models for each frame of motion. These tube models thus became the cord characters in the movie. All geometric models were generated using in-house software developed at Ohio-State University. The project also served as a platform for experimentation for the research and development of TROUT rendering software written by Scott Dyer of the Ohio Supercomputer Graphics Project. Further software support was provided by John Fujii, Susan Amkraut, John Donkin and Jeff Light.



ENS

Jon Mc Cormack

Independent Artist

Victoria

Australia

"ENS" 1990 6 minutes

"ENS" is a computer generated animation exploring the abstract notion of an entity via the virtual space of computer animation. The film follows the journey of three cloud like balls as they travel through digital landscapes, inspired by dreams. We discover huge mechanical pillars, metaphors for both individual thought and life in cities. We journey through the door linking mind and dream. Finally, the balls reach their goal - and release the individual pillar (and the individual) from its mechanical labour. "ENS" is an exploration of the aesthetics of pure geometry, an expression of the coldness and abstraction of similarity, groups and cities and the parallel between the three-dimensional virtual space of the computer and of one's own unconscious mind.

Notes:

Computer Generated Animation

Direction, animation, sound and editing: Jon McCormack

Software: Jon McCormack & Wavefront Technologies

Thanks to: John Flemming, Julie Ockenden, Noel Richards, Steve Smith

Live action component filmed at Yuragir National Park,
NSW, Australia

Computed on Silicon Graphics Workstations

Produced at the Video Paint Brush Company

Produced with the assistance of the Australian Film Commission

Art sts Statements

Film & Video Show





Delle Maxwell
Independent Artist
Princeton
U.S.A.

I write programs in order to create images. I prefer to work with a number of small program modules which cannot be easily altered or combined into larger hierarchies. These small modules are elements of the image vocabulary I am building. I see this as a rather open-ended way of working: my work is not informed by a single mathematical theory or the desire to create a closed system which only allows for the minor variations possible through the application of processes such as randomness or permutations. Yet any of these methods may be incorporated as compositional elements.

Rather than trying to force conformity to our familiar world through simulation and exact the modeling of the natural environment, my goal is to construct a different realm within computational space. The imitation of the real through the endless accumulation of detail usually fails to capture the essence of the object it tries to reveal. Therefore, I am trying to explore issues and processes which are unique to this computational space, and to construct images which embody the “reality” of this world.

Construction of computer worlds also informs our perception of the natural world. Dialogues on the blurring of meaning between artificial and the real, of undifferentiated and unlimited scale, of enclosed and yet boundless space arise directly from the incorporation of this technology into our culture. As we move from simulation to the construction of these new environments, the nature of this dialogue will also change. “Reflection” mirrors images within its own picture space but is neither a true reflection nor a simulation of the natural world. The forms retain their simplified algorithmic appearance rather than try to mimic nature.

“Greenhouse” is an outsider’s close-up view of this enclosure.

In “Spaceless space” the perspective viewpoints used are artifacts of “realism” - of how we construct our view of the everyday world. There are several spaces with disjoint viewpoints; each has its own boundaries and rules, yet all inhabit the same global region simultaneously.



Milton Montenegro
Independent Artist
Rio de Janeiro
Brasil

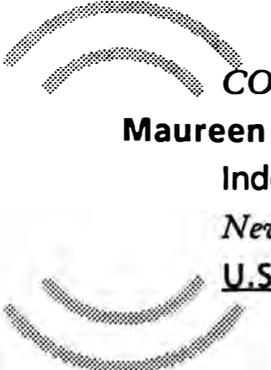


I have always thought about Photography not as a tool for documenting reality, but rather as a medium through which I could creatively express my ideas and feelings. Computer graphics gave me a fascinating new realm of possibilities for creating images. I think it is a privilege to witness and take part in the early stages of Electronic Imaging.

Art sts Statements

Exhibition **SISEA**





CONTINUUM - 1. INITIATION

Maureen Nappi / Dean Winkler

Independent Artists

New York

U.S.A.

CONTINUUM - 1. INITIATION 1989 2.48 minutes

INITIATION is the first of four movements in the CONTINUUM set created by Maureen Nappi and Dean Winkler. The underlying theme of INITIATION is to elicit a state of suspension in a physical, intellectual, emotional and spiritual manner on the part of the viewer. With music by Philip Glass performed by the Kronos String Quartet, the four-part work-in-progress allegorically illustrates our life cycles utilizing a range of electronic imagery.

Credits:

Video by Maureen Nappi & Dean Winkler
Music composed by Phillip Glass
performed by the Kronos String Quartet
Nonesuch Records

Wavefront support:
Michael Limber, Lenny Donnel
Alex Seiden and Andy White

Compositing:
Tim Farrel

Software:
Scott Gordon & Alex Seiden

Images realized at Post Perfect, NYC
copyright NAPPI / WINKLER

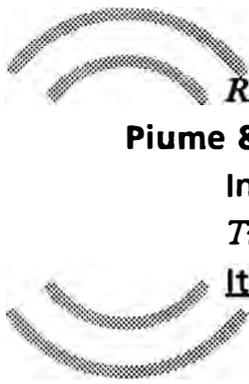
Hardware:

Silicon Graphics 3130 work stations
Celerity 1260 rendering engines
Sillicon Graphics CS-12 rendering engine
Raster Tech one/80 frame buffer
Quantel Paintbox and Harry with Rainbow
Grass Valley Group Kaleidoscope digital video image
processors
Grass Vally Group GVG-300 switcher
Abekas A-62 digital disk recorder
CMX-3600 editing controller
Sony DVR-1000 digital videotape recorders
Sony DVR-10 digital videotape recorders

Software:

Wavefront 3D animation software (Model, Preview and Image)
Post Perfect object generation/interpolation software
Quantel Ver. 4.16 operating system
Kaleidoscope Ver. 4 Ob

Artists Statements



RITO 1.2

Piume & Vigore

Independent Artists

Treviso

Italy

“RITO 1.2”

- A ritual based upon the dualistic juxtaposition of opposed elements: cold/hot (computer generated images and body images); image/gesture; technology/tribalism; alienation/inner journey.
- A ritual which erupts abruptly out of the ordinary, like a streak of madness; it unrolls and exhausts itself, going back into normality.
- The search of a magic dimension of an archetypal and meaningful gesture drowned in past memories; a ritual game that becomes also alchemy of the being.
- Spirals as the symbols of ever-growing and ever-changing energy, become the track that must be followed to loose appearances - the superfluous - and to gain being - the essential.
- Synthetic spirals and movement spirals, in circular gestures, of words (almost magic formulas) not as mere imitation but as a search of a distilled state of being.

The video projection takes place from a totem-box whose operator, an entity who controls and lets the rite happen, creates images on a computer, i.e. the images are not recorded on video-tape but are being constructed in real time, interacting with the performance itself.



C.B. Rubin

Department of Art, University of Vermont

Burlington, Vermont

U.S.A.



Computer Art, exhibited as Cibachrome prints

The work in this group is based on compositions found in two genres of medieval Hebrew manuscripts. The Marseille Carpet pages are based on motifs from the Marseille Bible, completed in Toledo, Spain, in 1260, and housed in the bibliotheque municipale in Marseille, France. The other works are loosely based on the structures of manuscripts from Germany and neighboring countries, which rely on architectural forms to contain diverse image fragments and text. As the play among the various components of images and text can be extremely complex, the architecture provides a unifying structure. Unlike Christian manuscripts, a single letter or any element which does not have meaning in and of itself is never isolated in Hebrew manuscripts.

Since my training as a painter and my own sensibility is naturally a product of contemporary America, I found it challenging to utilize the traditional designs of the texts without producing superficial imitations. By scanning photographs of the pages into the computer, I was able to work with them, modify them, and come to know them until they became familiar forms. By working back and forth in the computer between my own imagery and the codified motifs, I began to understand how these motifs could inspire my work. My images came to echo the response of the words to the motifs in the original: they dance around the patterns. The motifs, in turn, took on new meaning as both anchoring structure and as active elements which do their own dance out of my imagery.

My compositions are an interweaving of computer drawings of flowers and landscapes, and photographs of architectural forms. The buildings in the series are mostly from snapshots I took in Brouge, Belgium, in the summer of 1989, but a few are from other places in Europe. I scanned the pictures into the Macintosh using Apple Scan, and then brought them into Studio/8. Using the "distort" function, I straightened them up so that a tower, for example looks as if I shot it straight on, rather than from the ground. For my carpet page works, I scanned photographs of the Bible into the computer in a similar fashion. I usually scan photographs as "line art", and color the images myself, so that I have control over how the colors are distributed.

All of the other components are "mouse" draw within the computer. I work directly from natural objects, flowers, or landscape sketches. Many of the original drawings were done on site in the south of France and in Israel, places rich in the history of mystical Jewish thought which influenced the source manuscripts. By drawing directly into the computer, rather than relying on scanning, I feel that the images grow more naturally within the medium of computer art.

The final images are done on the Macintosh, primarily within Studio/8. These pieces represent hours of going back and forth between variations of the same composition. The process is non-linear, as I begin with a template of my manuscripts sources (scanned from a book or photograph), and then layer my own imagery over it until the thinking the manuscript artist provides the structure for my own thought. Since the computer offers infinite possibilities for variations, the building and changing to the image is both intuitive and structured. Output is done by a service center, which prints from my disk directly to a slide, by means of a high quality film recorder. I then send the slide to Atlantic Filmworks, where the Cibachromes are printed.



Kazuya Sakai

University of Texas

Dallas

U.S.A.

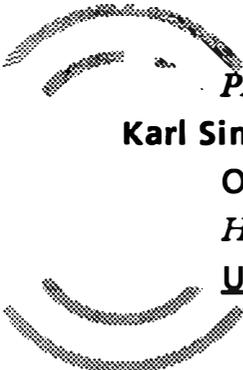
I have been all my artistic life a painter using traditional media like oil, acrylic or watercolors. But when around 7 years ago I learned the possibilities to use computer in the image making, I thought I found a new way to visualize my ideas in a quite different manner. My interest in the potential of the computer is not to make another version of my painting, but rather to find out the possibilities to make an image which I could not make in any other way. Regardless of the complexity of a given system I may be using, my concern is not with the mimetic aspect of image making neither in the degree of sophistication of the system. We know that computer art is still in its infancy.

The future of this art does not rest in replacing one medium for another, but to create a new genre with its own structure and aesthetic principles which are not subject to the traditional art.

Art sts Statements

Exhibition





PANSPERMENIA and PARTICLE DREAMS

Karl Sims

Optomystic

Hollywood, California

U.S.A.

PANSPERMENIA 1990 2.08 minutes

Panspermenia: The theory that life exists and is distributed throughout the universe in the form of germs or spores.

This piece depicts a single life cycle of an inter-galactic life form. Evolutionary mechanics of random variation and artificial selection were used for procedural generation of complex organic structures. Physical simulations, procedural plant growth, and 3D rendering were performed in parallel on Connection Machine Computers.

Software and Animation:

Karl Sims

Sound:

David Atherthon, David Grimes, Steve Blake, Target Productions

Computer Hardware:

Connection Machine System CM-2

Particle Dreams 1988 1.30 minutes

Software and Animation

Karl Sims / Optymistic

Sound:

Robert Moore, BLC Sound

Computer Hardware:

Connection Machine System CM-2

Artists Statements

Film & Video Show





***THE PROMISCUITY OF TIME. AN EQUATION
OO TIME AS CENTRIFUGE***

Mechtild Schmidt

Gesellschaft für Kunst und schnelle Zeit

New York

U.S.A.



The Promiscuity of Time. An Equation

OO Time as Centrifuge 1990 2.45 minutes

This tape is a collaboration with choreographer/dancer Jo Andres. The series of dances and video-interplays is based on the hypothesis of time as a subjective and fluctuant perception - and the measuring of time being but a psychologically reassuring aid. The manipulable time epitomizes the electronic age as much as the manipulable hand/foot symbolizes the machine age.

The formal structure of the project reflects its digital environment: mathematical equations and digital headings are associatively combined with the topic of each selection.

Artists Statements

Exhibition





John F. Sherman

Department of Art, Art History & Design

University of Notre Dame

Notre Dame

U.S.A.



Electronic image processing is re-defining the way designers think about and produce their work. The methodology and evolution of designers' projects lend themselves well to computer imaging. The goal of my image making is not only to exploit the many possibilities of a new imaging technology but also to participate in shaping the future of the aesthetic.

There is a great deal of debate today regarding the role a computer can play in the creative image-making process. The extension of technology through computing (image processing, programming, interactive image creation) has already begun to expand the possibilities of the medium. This major revolution in design has caused a turn toward the use of computing technology as a new means for interpreting the world, forcing both the image creator and the viewer to quickly let go of long held stylistic conventions. Unlike traditional artistic processes, technology greatly facilitates the ability to combine images from various sources. Video images, still photographs, drawings, type and other design elements can all be combined electronically in innovative new ways. A point is reached when new & different ideas arrive because of the process. But the process alone does not guide these ideas. Craft & intellect also join together, reaching a critical mass. As technology is mastered to serve and liberate the creative process, a new level is attained where innovative solutions to visual communication problems can be discovered.

I am very excited about using computers as a primary tool in my design and image-making. I have developed a unique approach with my work few other designers are able to do or emulate. My work is produced by PostScript programming, video capture, scanning and some interactive drawing software. I presently have a growing body of PostScript-produced images that demonstrate this. These finished images attain solutions by means of faster investigation, greater choice, and new creative possibilities. With them, I hope to create a new modern visual language that can only be achieved with the aid of a computer, but retain the magic about them that transcends their technical origins.

Art sts Statements

Exhibition  **SISEA**



Kenneth Snelson

Independent Artist

New York

U.S.A.

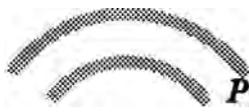
Most of my computer pictures are related to long-running, on-going, art work I call "Portrait of An Atom". Because I am interested in the nature of structure, especially when I build large outdoor sculptures, I am also interested in nature's ultimate structure: the atom with its surrounding system of electrons. In my pictures of atoms, each electron is represented by its complete orbit, that is, its wave-like pathway, a ring which fills space as if it were solid matter. Finally, even though I believe that the atom ought to be thought of as a genuine structure, no doubt just as logical in its workings as a microchip, my computer images are fantasy landscapes of worlds which might exist, but probably don't, certainly not in color.

I use a Silicon Graphics computer running Wavefront Technologies software.

Art sts Statements

Exhibition





POPUREVE

Nicole "Natalie" Stenger
Research Fellow MIT
Cambridge, Massachusetts
U.S.A.



"Popureve" is a revolving crystal whose time facets reflect visions of past en present French history.

My Art Recipe:

- hybridation of symbols
- rhythmic variations of intensity (light-colour-texture)
- joint composition with music
- enjoyment to work in the modern medium of myth

Artists Statements

Exhibition





Anna Ursyn

University of Wyoming

Laramie, Wyoming

U.S.A.



I convey the natural order and regularity of forms in a landscape. In my computer generated plots the non-verbal signs: balance of line, color relationships and light can conceivably serve as an enlargement of the natural rhythms, patterns and repetitions that make the very essence of our aesthetic experience, as we contemplate the landscape.

I feel the regularity of shapes and events in nature can make a strong aesthetic stimulus for a viewer, which evokes an emotional response, because the viewer has the experience of correctness of the natural order. I feel that similar correctness of order causes an aesthetical experience while creating or contemplating abstract art: where the mode of the work be abstract expressionism, geometric abstraction, or computer art graphics.

I found it necessary to transform my plots and slides into some other final graphic form. So far these transformations have consisted of color or black-and-white reprints, posters, collages, xeroxes, graphic and prints, photolithographs, photosilkscreens on canvas and paper, magazine illustrations, and invitation cards, digitalized images.

I started to put my computer programs in service of painting. I intended to create some landscape programs, half-abstract and representational as well, and to couple them with experiences connected with landscape paintings on canvas. I made repetitions of the same stylized image to enhance the symbolic meaning conveyed by these images, and to strengthen the reconstruction of the meaning under different circumstances.

The techniques used in the mixed media paintings were also transposed to the sculptural forms and the collage like character of the paintings was then used as a surface quality applied to the facets and facings of the sculpture. In this way the painting itself evolved into three dimensional form.

For me, computer generated artwork fits in the very essence of today's life style, with man's interference in nature, as it alleviates technological impact on our surroundings and links beauty of man made technical products and the aesthetics of artistic creations of mind.



Peter Vogel

Independent Artist

Freiburg

U.S.A.

Interactive sound sculptures

My electronic sculptures and reliefs react to the spectator by means of photocells or microphones. The observer with his gesture or movement can throw shadows upon the light sensitive cells or can talk to them, the object then reacts within the bounds of its possibilities which are sound, movement or light.

The subject of my work is the presentation of time structures which includes interactive and musical structures. The logic electronic function of these sculptures is determined, but the reactions sometimes seem random because of the sensitive dependence upon the time pattern of the input (the activities of the spectator).

The way to the aesthetics of this kind of art is an active one: in the process of discovering the behaviour and exploring the communication structures the spectator has to act and react. This structure is invisible in contrast to the spatial appearance, the exploration takes time, interaction is an appearance in time.

In interactive art the spectators role is changed from that of a passive observer to an active partner. The actual reciprocal action between object and spectator brings a different sensibilisation of the spectator in his relation to the work of art. His play instinct and aesthetic sense is activated, he develops new strategies, the variable reactivity of the object gives new impulses for cognitive search in the presented system. In interactive art the spectator always is confronted to himself, by looking to the reactive object he cannot but reflect his own behaviour.



LETTER STUDIES

Apostolis Zolotakis

Independent Artist

Groningen



Scan, the national institute for computer animation in Groningen, has enabled me to work with the Aesthedes graphics computer. In my work the process and experimentation (within certain pre-established limitations) are central, not a carefully planned final result.

Colorpatches, photographs, objects, etc are, after they have been digitized with a camera, the basic visual material that I then combine and manipulate with the paint capabilities of the computer. The resulting images carry a contrast between organic structures and anorganic pixels.

Another point of departure is typography. I use forms of characters because of their meaning and content. For most people characters belong to the world of graphic design and have nothing to do with fine arts. I would like to oppose that idea by creating "fine art" that consists of nothing else then characters. This form of art is for me not only a play of forms, but also contains an intrinsic content that results from the form of the chosen characters and their combinations.