Leonardo Electronic Almanac Volume 5, No. 5
May 1997

ISSN #1071-4391

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INTRODUCTION

< This issue >

Craig Harris

This month our feature article is a fascinating perspective on Robotic Art by Eduardo Kac and Marcel.li Antunez Roca. We also have profiles of two installations, a collection of book reviews, an update on the opportunities at iEAR Studios at Rensselaer Polytechnic Institute, and a group of announcements for upcoming events. Many of the announcements received this month relate to activities in the world of sound and music. I am always looking for information about a wide variety of creative activities, so please do notify me about events in your field and region.

< MIT Press moves - NOTE Change in LEA file server! >

MIT Press is moving across the street during approximately June 7 - 10, and that will mean a brief interruption in access to Leonardo Electronic Almanac and Leonardo On-Line. There will be a new URL as well for both of these web publications, so everyone should make the relevant changes in their bookmark lists to the following:

Leonardo Electronic Almanac:
http://mitpress.mit.edu/e-journals/LEA/

Leonardo On-Line:
http://mitpress.mit.edu/e-journals/Leonardo/

The old addresses are still supposed to function in order to maintain a degree of backward compatibility, and "http://mitpress.mit.edu/LEA/" will also work. The current MIT Press file server will go off line, and the expectation is that there will be a quick transition. But in the computer world, one never can be sure. Your patience will be appreciated as we undergo this change, and if there are unexpected difficulties, you always have the text version of LEA!

< LEA Web Development >

Major reconstruction has been taking place for the LEA web site, as reported a few months ago. While I have been implementing transormations along the way in order to facilitate access in the interim, the new system has been in development mainly off-line because the changes were too dramatic to install until the basic foundation had been created. A beta site has been installed and is being tested, and we are happy to announce our plans to bring the new site on-line when the new MIT Press file server is turned on.

Naturally this is an ongoing process, with some significant changes still to be implemented during the rest of the year. But enough has been accomplished to provide a significant improvement in navigation and access to the rich amount of

information currently residing on the site. We can look forward to more developments during the coming months, with work still taking place to develop a better indexing and searching mechanism, and some of the layout systems are still undergoing changes. We hope to implement threaded discussion lists (such as one finds at "The Thing", for those of you who know about that system). Many thanks to Patrick Maun for his excellent design and hard work!

< Errata >

I am sorry to report that there were some errors in last month's text issue of LEA (LEA 5:4). The web version is and has been correct, but we failed to catch some unfortunate errors in Leonardo Digital Reviews. The titles for the reviews were placed with the incorrect reviews, leading to the obvious resulting confusion. I apologize to the authors, reviewers and readers for the mistakes.

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FEATURE ARTICLES

< Robotic Art >
Eduardo Kac and Marcel.li Antunez Roca

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After meeting in Helsinki in October of 1996 during the MuuMedia Festival, Eduardo Kac and Marcel.li Antunez Roca, both participants in the robotic art show "Metamachines: Where is the Body?", at Otso Gallery, in Tapiola, and in the Art and Robotics Seminar, at the Ateneum, in Helsinki, decided to share their notes and drafted this joint statement:

Expanding the narrow definition of robots in science, engineering, and industry, art robots make room for social criticism, personal concerns, and the free play of imagination and fantasy. Robots are objects that work in time and space. Their open and diverse spatio-temporal structures are capable of specific responses to differing stimuli. Some of the visual forms that robotic art can take include autonomous real-space agents, biomorphic automata, electronic prosthetics integrated with living organisms, and telerobots

 ISSN 1071-4391 ISBN 978-0-9833571-0-0

(including WebBots).

Robots are not only objects to be perceived by the public-as is the case with all other art forms-but are themselves capable of perceiving the public, responding according to the possibilities of their sensors. Robots display behavior. Robotic behavior can be mimetic, synthetic, or a combination of both. Simulating physical and temporal aspects of our existence, robots are capable of inventing new behaviors.

One of the crucial concerns of robotic art is the nature of a robot's behavior: Is it autonomous, semi-autonomous, responsive, interactive, adaptive, organic, adaptable, telepresential, or otherwise? The behavior of other agents with which robots may interact is also key to robotic art. The interplay that occurs between all involved in a given piece (robots, humans, etc.) defines the specific qualities of that piece.

Robots are not sculptures, paintings, or video art. Art robots are not to be confused in any way with mechanical-looking, static anthropomorphic statues or sculptures (even those that display moving video images). Programs that retrieve information and perform other functions on the Internet, despite being misleadingly called Internet robots, or Netbots, are not related to robotic art. Robotic art always involves a component of real space.

Robots are a new art form and they are prone to be hybridized with diverse technologies. This quality makes them transcend the category of object to be diffused into the environment.

Robotic art can occur in physical places, in telematic space, in virtual environments, or any combination of these that includes an actual location. Robots are new things in the art world. Robotic art has antecedents in the work of artists such as Tinguely and Paik, but it constitutes a completely unique art form in its own right, different from sculpture, video, performance, and other familiar artistic practices. Prototypes are found in sequential machines that endlessly repeat their temporal structures. Only microprocessors allow a more complex and distinct behavior each time, be it in specific or random form. Microprocessors are as important in robotic art as brushes, paint, and canvases are in painting.

Robots belong to a new category of objects and situations disruptive to the traditional taxonomy of art. Where one once spoke of boundaries, borders, and limits we find today new territories. These new artistic terrains are open to new possibilities and relate to one another in productive ways. In these new heterodox terrains, hybrid creatures with no preceding models are born. Coupled with telecommunications media, for example, robotics gives origin to telepresence art, in which the robot is the host of a remote subject.

As a genre, robots do not aspire to convert themselves into closed and fixed forms. They are capable of perishing as a concept if a new situation arises to encompass and surpass them. Robots exist at a juncture of creative debate and conceptual exploration that manifest themselves in expanded telematic and cybernetic domains.

EDUARDO KAC
Eduardo Kac is an artist and writer who works with electronic and photonic media. His work has been exhibited widely in the United States, Europe, and South America. Kac's works belong to the permanent collections of the Museum of Modern Art in New York, the

Museum of Holography in Chicago, and the Museum of Modern Art in Rio de Janeiro, Brazil, among others. He is a member of the editorial board of the journal Leonardo. His anthology "New Media Poetry: Poetic Innovation and New Technologies" was published in 1996 as a special issue of the journal Visible Language, of which he was a guest editor. His writings have appeared in several books and journals in many languages, including French, German, English, Portuguese, Spanish, Hungarian, Finnish and Russian. He is an Assistant Professor of Art and Technology at the School of the Art Institute of Chicago and has received numerous grants and awards for his work. As of September 1997 his address will be:

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MARCEL.LI ANTUNEZ ROCA
Visual artist. Founder member of La Fura dels Baus and responsible for the artistic direction of the following performances: Accions (1984), Suz/o/Suz (1985) and Tier Mon (1988). He left the company in 1990. Member of Los Rinos -Total Art Group- who created, among other things, the macroperformance Rinolacxia (1991). As regards his visual work, special mention should be made of the sculptures made of flesh, and the interactive robot "JoAn, the Flesh Man" (1993, produced in collaboration with Sergi Jorda). In 1994/96 made his interactive performance EPIZOO. His last works EPIZOO & JoAn have presented in several countries like Mexico, Italy, Germany, Finland, Denmark, Serbia, Portugal, Spain, France, England, and Switzerland.

PROFILES

< Sands in Time >

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The installation by Ines Amado uses digital communication and the Internet to combine live and still images sent by satellite from the Azores with live and still images of London Docklands. The images are sequentially overlaid on large glass etched screens hanging in Trinity Buoy Wharf Lighthouse. The twin glass panels are engraved with Amado's text, forming the ethereal pages of a multimedia, multidimensional book.

Taken as a whole, the installation evokes the notion of renewal, regeneration and transformation in the natural and technological landscapes.

When the live video feeds are combined with the hanging

 ISSN 1071-4391 ISBN 978-0-9833571-0-0

glass panels, the final display is a diffused and layered image. This image is continuously filmed with a digital camera interfaced to a computer and routed via the Internet to a display in the Azores - closing the loop of the images that began in the islands. The installation images are also routed directly to a video web server in Aberystwyth, Wales, so that anyone with a Netscape compatible browser can participate in the opening. A high-bandwidth multicast of the opening will also be transmitted from the University College London to users who are directly connected to the Internet backbone. After the opening, the web site will remain live with changing images for the duration of the exhibition.

ARTIST BIO
Ines Amado is a Portuguese artist living and working in England. She has exhibited widely throughout England and Europe and has in recent years been involved in the organization and participation in workshops and has curated exhibitions in Belgium, Poland, Norway, England and Portugal. Amado has studios in London and Welwyn Garden City and lectures in sculpture at the School of Art and Design, University of Hertfordshire, Manor Road, Hatfield, Herts. AL10 9TL UK.

ARTIST STATEMENT:
The Azores have served since their discovery as a conduit for and generator of new ideas; they were the routing point for the first trans-Atlantic communication cables, the mid point for the first trans-Atlantic airline services, and an international gateway ferrying ideas and communications between peoples and continents. By using this technology Amado is touching at the essence of the Azores, adding new layers in the evolution of communication and the dissemination of ideas.

The exhibition Sands in Time is hosted by the London Docklands Development Corporation, 3 Limeharbour, Isle of Dogs, London E14.
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< Windows 97 - a new site work by Paul Wong >

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Thursday 29 - Saturday 31 May 1997
ICA, London.
Admission free.

ICA programme info:
+44 (0) 171 930 3647
press : 0171 873 0061
<http://www.illumin.co.uk/ica>

“One Country; two systems. Capitalism with Chinese characters.” *
*quote by Deng Xiaoping

Paul Wong:
" The 1898 -1997 de / re colonization of Hong Kong from Britain to China, the changing of the guard over 6.3 million people, takes place on Canada Day, June 30th. Coming as it does at the end of the 20th century this transfer of power places Hong Kong at the point where the era of European domination ends and the emergence of New Asia begins."

Windows 97 is a work consisting of large backbit colour photographs of Queen Elizabeth II and Chairman Mao bordered by flashing neon symbols: the Union Jack, red star, AK 46 automatic rifle, money signs, bowl of rice, new Hong Kong logo, a crown, Chinese calligraphy and the atomic symbol.

It is a site specific work that has been designed for the grand windows of the classical and richly decorated Nash Room, of the Institute of Contemporary Arts overlooking the Mall, London. It is designed to be viewed from inside and outside the building and continues Wong's examinations into language, cultural displacement in the old and new worlds, media culture and the contemporary iconography of symbols and signs.

Paul Wong is Chinese Canadian and one of Canada's leading visual, installation, and video artists. In addition to this work the following videos will be shown at the ICA cinema: 'Ordinary Shadows, Chinese Shade', 'Chinaman's Peak: Walking the Mountain', 'So Are You' and 'Blending Milk & Water: Sex in the New World'.

Paul Wong will be giving a talk about his work at 6pm on May 30 at the ICA. The talk is free, but ICA day membership is required.

Windows 97 is a co-commission by Locus+ and ICA Live Arts.

These works are part of Fortune Cookies an international season of new experimental works in performance and installation by over twenty artists from China, Hong Kong, Singapore, Taiwan and the diasporic communities of the world being held at the ICA in London from May 9 - June 8.

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LEONARDO DIGITAL REVIEWS
May 1997

Editor: Roger Malina
Coordinating Editor: Kasey Rios Asberry
Editorial Advisors: Chet Grycz, Judy Malloy, Annick Bureaud, Marc Battier, Curtis E.A. Karnow

Review Panel (includes): Rudolf Arnheim, Wilfred Arnold, Marc Battier, Robert Coburn, Mary Cure, Shawn Decker, Tim Druckrey, Jose Elguero, Michele Emmer, Josh Firebaugh, Eva Belik Firebaugh, Geoff Gaines, Bulat M. Galeyev, George Gessert, Thom Gillespie, Francesco Giomi, Tony Green, Molly Hankwitz, Istvan Hargittai, Gerald Hartnett, Paul Hertz, Curtis Karnow, Richard Land, Roger Malina, Diana Meckley, Axel Mulder, Kevin Murray, Youri Nazaroff, Joseph Nechvatal, Simon Penny, Clifford Pickover, Harry Rand, Sonya Rapoport, Kasey Rios Asberry, Jason Vantomme, Misha Vaughn, Rainer Voltz, Christopher Willard, Barbara Lee Williams, Stephen Wilson

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< Editorial: In Collaboration with Machines >

Curtis E.A. Karnow
Editorial Advisor

Art is I; Science is we.
---Claude Bernard (1813--1878)

We enlist the simulated intelligence of technology in the making of art. It is a natural collaboration to most of us, we who share a world with digital doppelgangers, autonomous agents and robots. It may be natural, but there is a leap here from the use of technology to carry out the express intention of the artist to technology that collaborates with that intention. Prior to digital (computer) technology, the implements of art may have constrained creation, but they did not decide it. That is, printing presses, ink, chisel and marble, the range and tone of musical instruments---all these determined a universe of possibilities for the artist, but did not choose among the possibilities.

Computers can and do choose---within the constraints imposed by humans. The roles are reversed.

I do not mean to exaggerate: humans often reserve the right to throw away the computers' product, and so impose their aesthetic judgment. If the artist does not impose that judgment, then producers, publishers and curators will. But the fact remains: software produces luscious music and poetry. Brian Eno has software perform for him as he "writes" his own music---and he told an audience last year that the computer's music can be as good as his "own." The simplest use of a computer to make pictures implicates the collaboration of the machines. The apparent serendipity of line, color and texture, the sight of multiple layers of transparent and opaque colors, are provided by the computer; software can even create a work in the style of Matisse, Monet or van Gogh.

Computers, machines and automation are the metal heart of much performance art, embodied so to speak in the exquisite exhibitions of Survival Research Laboratories (SRL). SRL makes enormous machines from the flotsam and jetsam of a machine world: V2 engines, trucks, flame throwers, wheels, buzz saws and farm equipment are smelted together to form enormous, apparently autonomous robots that move and attack to the literally deafening screams of explosions and machine noise and the incineration of flame and gasoline. The machines move with inchoate menace, threatening the humans who stand by in awe, shredding the theater and eventually each other. It is a joke, of course---it is theater, after all. Humans dressed in discreet black have some control via radio signals, but it can get out of hand, and SRL's founder lost part of his body to one of the machines. It is the best kind of joke, the kind that sometimes is not.

SRL's work is a puissant metaphor for the autonomous machine. But both those machines and their software cousins reach back through their media---through the software and pieces of erstwhile metal- --to collaborate with makers from the past. Someone (probably many people) wrote the software; someone operated it; someone decided to use it; someone combined it with other programs.

These software collages may now be ordinary, but they are bar sinister in the eyes of the law. Copyright law needs an author, a maker, a creator, an utterly human being who can own

things, make money, hire lawyers and sue people. The ideal here is the embodied genius of one person---the poet with pen, the painter with brush. Reward the author with rights, the theory is, and more art will be made. Without an artist to own the work, copyright law flounders. To be sure, there is the notion of a "joint work," but that requires the deliberate contributions of multiple human authors toward an intended joint work. Can a program intend? Can the author of a program intend the unpredictable output of the software to be a contribution to a future work with other unknown humans? Not likely. But at least in these current scenarios humans, only, are critically involved in the collage of creation. They can, if necessary, be left to the dubious pleasures of litigation to sort out their legal rights. And if that sounds unappetizing, the humans can make contracts to state their rights.

Others have remarked the evisceration of authorship, the confusion of maker and audience in the digital realm and the advent of art as an electronic spasm. But now, with the birth of truly autonomous intelligent software agents, the collaboration is moving away from a plain link to humans. We are moving toward creation of machine art, or direct collaboration with machines, in which software makes aesthetic judgments. The Internet is a place where we spend an increasing amount of our time, both socially and for business, and art erupts there too. For example, the San Francisco Museum of Modern Art has three web sites in its permanent collection [1]. Why should not art be made by the new crop of portable, machine-independent software agents made with Java or ActiveX [2]? Already we note the juvenile forms: applets spin and dance on our screens, using the two basic sensory vehicles of sight and sound. Today these applets work directly as programmed. But specifically intelligent applets are designed to work with other agents; who can predict the results of their combined efforts?
And who will own their products? With whom---or with what---do we negotiate for the rights to use or copy works of communities of intelligent agents? Who sues when an unauthorized copy is made? How do we handle compensation?

There are no obvious responses. Copyright law may abdicate the field; or programs may be deemed legal fictions, like corporations, that can sue and "sign" contracts---through their human agents. Or perhaps we will make the products of art free and pay humans for such effort as they make toward the product, unlinked to the value of the result. There are many responses to this argument between copyright's search for an author and the technology's refusal to provide it. It is up to us to map these out and to push toward the solutions that encourage creativity.

We say it is up to us, but our machine collaborators may differ.

Notes
1. See, for example, <http://www.atlasmagazine.com>.
2. Sun Microsystems' Java and Microsoft's ActiveX are programming language/libraries, descendants of C++ that can be used to create small applications, or "applets." Applets can be transmitted via the Internet and are generally platform and operating system independent. These are commonly found embedded in Web pages, activated by the remote user's mouse-click. Applets are now being produced to interact with other

 ISSN 1071-4391 ISBN 978-0-9833571-0-0

applets: these so-called intelligent agents "on their own" investigate the processing environment and determine how best to interact with other unfamiliar applets. "Software agents" are applets that, if written to interact with other agents and to operate with only the most general direction from the human user, may qualify as "intelligent."

Further Reading

Brown, Paul, "Metamedia and Cyberspace," in Philip Hayward, ed., _Culture, Technology and Creativity_ (London: Libbey, undated) pp. 227--243.
Hofstadter, Douglas, _Fluid Concepts and Creative Analogies_ (New York: Basic Books, 1995).
Holland, John, _Adaption in Natural and Artificial Systems_ (Cambridge, MA: MIT Press, 1993).
Karnow, Curtis, "Data Morphing: Ownership, Copyright and Creation," Leonardo 27, No. 2, 117--122 (1994); and Karnow, Curtis, "Liability for Distributed Artificial Intelligences," _Berkeley Technology Law Journal_ 11 p. 147--204 (1996); to be collected in Karnow, Curtis, Future Codes: Essays in Advanced Computer Technology and the Law (Boston and London: Artech House, 1997).
Kroker, Arthur, _Spasm_ (New York: St. Martin's Press, 1993).
Ludwig, Mark, _Computer Viruses, Artificial Life and Evolution_ (Tucson, AZ: American Eagle Publications, 1993).
Maes, Pattie, "Artificial Life Meets Entertainment: Lifelike Autonomous Agents," _Communications of the ACM_ (November 1995) p. 108.

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< Book Review: The Future of the Book Edited by Geoffrey Nunberg >

University of California Press
Berkeley, 1996

Reviewed by Kevin Murray
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The enclave of San Marino (Serenissima Repubblica di San Marino) seems the perfect setting for a conference on how the book will fare now it is besieged by the new digital media. Umberto Eco helps direct their Centre for Semiotic and Cognitive Studies and this conference reflects his abiding interest in the technology of the book. In his afterword, Eco sounds the call for this conference: 'Without the invention of Daguerre, Impressionism could not have been possible'. We are prompted thus to ask ourselves, what new form of representation responds to the challenge of electronic publishing. The responses, now stamped onto the pages of this book, can be divided into the usual two camps: ancients and moderns. The ancients would see the advent of hypertext as restoring the openness of writing the preceded the Gutenberg press. In 'The body of the text' Raffaele Simone heralds the time when texts will lose their authorial constraints and 'once more become open texts as in the Middle Ages'. The 'modern' also identifies a liberating effect of multimedia, but pitches it in the future. Hyper-poet Michael Joyce most vividly captures this story of text's release into a fluid and vectored circuitry of meaning. His writing demonstrates this: I once wrote about electronic text that 'our desire is a criticism that lapses before the form and so won't let form return to transparency.' I am not wise enough to be able to say what that means exactly but I know I was trying to think about how to talk about the replacement of the author in its

double sense: the author moves to another place, the author is put in another place. It's an endearing kind of self-reference that enacts the message of authorial fracture. It also signals the danger of this kind of discourse.

Such frisons of textual ecstasy emerges now and then, demonstrating how sybaritism can develop when dwelling on the formalities of language. Thankfully, The Future of the Book counters this indulgence in two ways. First, by including some perspicacious comments on the assumptions behind the 'information revolution'. The editor's chapter embeds a quote from fellow contributor: 'we are...in the situation, as Paul Duguid puts it, of breaking the banks and hoping still to have a river.' Stuart Brand's catchcry, 'Information wants to be free', is dissected intelligently by that Paul Duguid-good news for those awaiting the information restoration. The second counter to techno-mysticism is attention to the materiality of books. In the place of anarchy, Duguid returns to the mechanical logic of books (a bibliology?). His discussion of the hinge aligns the evolution of books to that of doors (prompting a wish for the companion volume on the future of doors). Electronic texts bring into relief the taken-for-granted operations of the book: 'the closed cover, the turned page, broken spine, serial form, immutable text, revealing heft, distinctive formats, handy size...'. Essays by James O'Donnell, Luca Toschi and Jay David Bolter reveal the other lives of books beyond the printed volume in use today. Such discussion counters the tendency to announce the 'end of the book', but think instead of their next incarnation.

'The Future of the Book' leaves the reader hungry for more. It would be useful to have a comparison between the technology of illuminated manuscripts and HTML, a more detailed analyses of popular hypertext such as Myst, and some reference to William Gibson's experiment in the self-destroying electronic text, Agrippa. As with most conference books, it represents a useful sampler of the field, rather than a comprehensive survey. We can only hope that such interesting thinkers will continue to be supported in providing intellectual bridges between the most useful elements of books and expressive forms in development.

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< Book Review: Making PCR: A story of biotechnology,
by Paul Rabinow >
University of Chicago Press,
1996, 190 pp. ISBN 0-226-70147-6

Reviewed by Roger F Malina,
E-mail: leo@mitpress.mit.edu (as of 6/10/97)

This is a detailed recounting of the invention and development of the polymerase chain reaction (PCR) within the Cetus Company of Emeryville, California. PCR has proved to be the fundamental tool that has allowed molecular biology to spawn the industries of biotechnology. The techniques allows the direct identification of specific segments of the DNA molecule and more importantly allows their replication million fold in very short periods of time. As a result genetic material becomes widely available for experimentation, outside the context of living systems. The importance of this invention was recognized by the award of the Nobel to Kary B Mullis who shared the 1993 Chemistry Prize. Rabinow presents the story as an ethnographer's account combining his retelling of the sequence of events, and interviews with some of the main

participants within the company.

Rabinow provides a rather direct telling of the tale of scientific discovery, descriptions of the social and working environment within the start up biotech company, the personality conflicts and the relationships with university researchers. By the end of the story, Mullis has left the company and the rights to the invention have been acquired by Hoffman-LaRoche for $300 million, and Chiron Inc has bought the rest of the company for $660 million.

The story of scientific discovery and technical invention within small start up companies represents a major new development in the organization of science. By comparison the tale of discovery of The Double Helix by Watson and Crick seems tame in comparison, with fame and glory being the first public rewards. The Cetus story however shows clearly that academic research has no monopoly on creating environments where creative scientists can flourish. Indeed Rabinow makes the compelling point that science by team work can be best accomplished within the environments of industrial research labs where academia's fixation on individual solo work, and publication, often hinders the bringing together of interdisciplinary teams needed for breakthrough discoveries. Ten years later, a similar feeding frenzy is being seen in the competitive gold rush for exploitation of the new communication and multimedia technologies. Art and films school students, as well as computer scientists, are finding productive creative environments in small industrial research labs.

With the end of the cold war, government funding of basic science is dropping in the developed countries. The new social landscape of science is beginning to emerge on the boundary between academia and the commercial world, with all the concomitant stresses to received wisdom about science and its purposes. As the newly emerging Asian nations begin to make their presence felt, and the Chinese century begins, we can fully expect a reconfiguration in the way that science is done. Just as the gentlemanly science of the eighteenth and nineteenth century was transformed by the industrial revolution, and the collegial science of the early nineteenth century by the arrival of government funding with the world wars, so we can expect that the new patrons of science will require a new "compact" with the scientific community.

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< Book Review: Cognition and the Visual Arts, by Robert Solso >

A Bradford Book.
The MIT Press:
Cambridge, Massachusetts and London, U.K., 1996
(paper, original hardback was published in 1994).
294 pp. $ 17.50. ISBN: 0-262-69186-8.

Reviewed by Istvan Hargittai
E-mail: <hargittai@ch.bme.hu>

This textbook was developed from Professor Solso's lecture notes of an introductory-level course with the same title. It has elements of physiology, psychology, art history and art appreciation. In a didactic order it starts with the mechanism of vision, the role of the brain, perception and visual cognition. Then it moves on to visual art with some special

features, such as perspective, emphasized. It culminates in some case studies illustrating connections between canonic representation, memory and the cognition of art.

That the book grew out of lecture notes is a didactic plus. Solso must be a persuasive teacher, and the original setting of the course at London University provided ideal environment for an impulsive lecturer. He himself writes in the introduction, "On more than one occasion, in the middle of a lecture, I would announce that a perfect example of linear perspective in Egyptian art, for example, could be seen in the British Museum, which was about five minutes from the classroom, and I would bolt out the door followed by a dozen giddy students and dash down Malet Street to see the real McCoy." I wonder what may substitute for this element of drama when the course is taught in Nevada. There is certainly no substitute for it in the book.

The sections on physiology are certainly a strength in the introductory part. I would like to add that recent studies in the physical sciences have determined the time scale of the information transfer in vision at the femtosecond order of magnitude (10<^>-15<V> seconds).

There is an impressive reference list for a textbook. It is somewhat disappointing, though, that a closer look reveals, for example, that the two Gombrich books in this list are cited merely for reproducing a drawing from each. Gombrich fared better, however, than some others because sources are not given for all the illustrations, let alone are they credited---for example, the painting (Figure 1.8, p. 12) in which Newton breaks sunlight into spectral colors. The number and quality of illustrations serve the didactic purpose well. Risking to sound frivolous, I mention, though, that I noticed teacups or teacup shapes appearing in a total of five pages. Some illustrations are discussed with poetic flavor, such as Kandinsky's _Cossacks_ (pp. 235--236), others are merely reproduced and their titles mentioned in passing as an example. This is the fate of Lichtenstein's _Preparedness_ (p. 229). It is thrown in to illustrate perspective. It might have been instructive for the students to mention that preparedness was a theme of government during World War II and the Cold War. In addition to the seriousness of the topic one cannot fail to spot some ironic overtone in the geometrical rigors of the painting.

By and large the book is produced nicely and with care. I liked especially the logos at the beginning and end of the chapters. They, again, would have benefited from having their sources credited. The next edition would gain a lot from more scouting in several aspects. And I anticipate a next edition, indeed, because the book is valuable.

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< Digital Review Notes >

Leonardo Digital Reviews is a review journal published regularly as a section of the Leonardo Electronic Almanac. Leonardo Digital Reviews covers publications, conferences, events and publicly presented performances and exhibits. The focus is the work of artists, scientists, technologists and scholars dealing with the interaction of the arts, sciences and technology. Topics covered include the work of visual artists, composers and multimedia artists using new media and technologies in their work, artists dealing with issues and

 ISSN 1071-4391 ISBN 978-0-9833571-0-0

concepts from contemporary science, the cultural dimensions of science and technology and the work of scholars and historians in related fields.

Specifically, we publish:

a) Reviews of publications in electronic formats (CD, CD-ROM, CDI, on-line, diskette, WWW, etc.).
b) Reviews of print publications, events, conferences, and exhibits dealing with art, science and technology.
Accepted reviews will be published in Leonardo Digital Reviews. Reviews of key works will also be considered for publication in the Leonardo Journal and Leonardo Music Journal published in print by MIT Press. Authors, artists and others interested in having their (physical) publications considered for review in Leonardo Digital Reviews should mail a copy of the publication to Leonardo, 425 Market Street, San Francisco CA 94107, USA. Event and exhibit organizers, and authors of virtual/electronic publications and events interested in having their event reviewed should send information in advance electronically (only) to:

davinci@uclink.berkeley.edu

Individuals interested in being added to the Leonardo Digital Reviews review panel should email (only) their curriculum vitae to:

leo@mitpress.mit.edu (as of 6/10/97)

We are particularly seeking reviewers who can review material in other languages than English. Unsolicited reviews are not accepted by LDR.

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< End Leonardo Digital Reviews MAY 1997 >

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OPPORTUNITIES

< UPDATE: Electronic Arts Tenure Track Position - iEAR STUDIOS
Department of the Arts, Rensselaer Polytechnic Institute >

Prof. Larry Kagan
Electronic Art Search Committee
iEAR Studios, DCC 135
Rensselaer Polytechnic Institute
Troy, NY 12180
Tel: (518)276-8083
Fax:(518)276-4780
Email: kaganl@rpi.edu

We are re-advertising two new tenure track faculty positions. These positions were previously advertised as “pending funding,” but have now been fully funded and identified as tenure track. This posting is for a Prof. of ELECTRONIC ARTS. The other position is for a Prof. of ELECTRONIC ARTS HISTORY, and is posted separately. These announcements are also available at http://www.rpi.edu/dept/iear.

Tenure Track Faculty Vacancy:
ASSISTANT PROFESSOR OF ELECTRONIC ARTS

Rank: Assistant Professor, tenure track
Salary: commensurate with experience
Beginning date: August 1997

Primary teaching responsibility: interdisciplinary graduate and undergraduate studio courses in electronic art, using the computer as a primary tool in the creation of visual art. Besides traditional computer graphics courses, classes could also explore interactivity, art on the World Wide Web, installation, or interactive sculpture.

Secondary teaching responsibilities could include: a) programming in Java, Director, Max, etc., b) interactive hardware and software development.

Non-teaching responsibilities may include: regular academic committee assignments, curatorial and grant writing responsibilities for one of several visiting artist series, student advisement and graduate thesis supervision. Candidate must be willing to become an active member of the Arts Department, with a strong commitment to teaching; must be on campus 3-4 days per week.

Qualifications: Professional activity and visibility as a practicing artist is highly desirable, as is previous experience in college teaching or professional art education. This position requires a Doctorate or MFA degree, or equivalent professional accomplishment and recognition.

To apply: Send a resume, a cover letter describing your qualifications, three letters of recommendation, and a sample of your work. Work samples may be in the form of books, articles, slides, videotapes (1/2” or 3/4”), CD-ROM or other appropriate media. Women and minorities are encouraged to apply. Rensselaer is an Equal Opportunity, Affirmative Action Employer. Applications will be considered beginning immediately, and will be accepted until the position is filled. Applications should be sent to the address listed above.

The iEAR Studios include state of the art facilities for creative work in computer music, video art, computer imaging and animation, media installation and performance. The Masters of Fine Arts program in Electronic Arts is based on the model of an art school in a sophisticated technological environment, and is clearly focused on the integration of the time-based electronic arts. The undergraduate program in Electronic Media, Arts and Communications is a major new initiative of Rensselaer’s School of Humanities and Social Sciences. Each semester the studios serve up to 200 undergraduate EMAC majors and non-majors, 25 full time graduate students in the MFA program, as well as faculty, staff, and visiting artists.

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ANNOUNCEMENTS

< KANSEI - The Technology of Emotion - an AIMI International Workshop >

Antonio Camurri
DIST - University of Genova
Laboratory of Musical Informatics
Viale Causa 13
I-16145 Genova ITALY
Tel. +39-10-3532988

 ISSN 1071-4391 ISBN 978-0-9833571-0-0

Fax +39-10-3532948
Email: music@dist.unige.it
URL: <http://musart.dist.unige.it>

Genova, 3-4 October 1997
Auditorium Teatro dell'Opera di Genova "Carlo Felice"

Important dates
June 1, 1997: extended abstracts (3 pages)
June 20, 1997: notification of acceptance
August 15, 1997: final papers due

Organized by
- AIMI - Associazione di Informatica Musicale Italiana
- Laboratory of Musical Informatics at DIST -
    Dept. of Computer Sciences,
    Faculty of Engineering, University of Genova
- Teatro Comunale dell'Opera Carlo Felice, Genova

The term "Kansei" refers in the Japanese culture to emotion in the sense of acquired sensibility towards art and music as a whole. The modeling of a system reflecting "emotional states" in computer artifacts is an emerging issue faced by a growing number of researchers. It is expected that it will produce a significant influence in a number of disciplines and applications like computer music, games and entertainment, multimodal interfaces in multimedia systems, etc. Research on "technology of emotion" is crucial in music. On the one hand, music is an ideal domain for experimenting and testing computer implementation of cognitive and AI models of emotion. On the other hand, such models may contribute to a better understanding of music tasks and to improve models of music cognition and perception. Moreover, "emotion technology" is relevant in interactive environments, which deal with the problem of extending music languages by action, body gesture, dance, visual media, effectors on stage (e.g., robots interacting with performers). In such environments, the stage is populated by agents observing the performers and dancers, communicating by means of music, visual media, and on-stage semi-autonomous navigation of small robotic actors. Such agents may embed both a rational and an emotional component, a concept of intelligence consistent with the term "Kansei". The scenario can be viewed as an evolution of "live electronics", where the director of the performance delegates the control on some "potentiometers" to the human or machine agents on stage. Models of emotion can intervene in modeling such control and communication mechanisms, as well as the behavior of the agents.

The Workshop aims at presenting the state-of-the-art research and discussing future directions.

Main topics include, but are not limited to, the following:
- emotional communication in new instruments and interfaces
- adaptive hyper-instruments
- modeling of emotion, sensibility and sensual intelligence
- understanding musical emotions
- agent models integrating rational and emotional components
- relations between music and gesture languages
- on-stage real-time multimodal environments
- interactive dance/music systems:
    dance interpretation and integration with music languages
- adaptive listening
- modeling expressive performance

Structure of the workshop

The workshop is structured in three main events: (i) scientific sessions, including presentations of research and systems with videos and live demos; (ii) a round table on the impact of such new approaches and technologies in the music field; (iii) a demonstration/concert in the evening of October 3, where a number of short Studios will be presented. The goal is not to present finished pieces of music, but to present examples on the various problems of extending music languages in the directions previously outlined. In this event, the systems developed at the Laboratorio di Informatica Musicale DIST in the framework of the three-year Project MIAMI (Multimodal Interaction for Advanced Multimedia Interfaces) funded by the Commission of the European Community will be utilized. See the web site http://musart.dist.unige.it for more details.
A number of authors selected by the committee will be asked to submit a revised version of their paper for a special issue of the JOURNAL OF NEW MUSIC RESEARCH (formerly INTERFACE).

Please send extended abstracts by e-mail (plain ASCII text files) to:
    Antonio Camurri, <music@dist.unige.it>

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< ICAD '97 -
    The Fourth International Conference on Auditory Display >

James A. Ballas, Ph.D.
Naval Research Laboratory
Code 5513
Washington, DC 20375-5337 USA

Dates: November 2-5, 1997

Sponsored by:
Xerox Palo Alto Research Center
Palo Alto, California

Continuing the work of the successful ICAD '92, '94, and '96 meetings, ICAD '97 will be held on November 2-5, 1997 in Palo Alto, California, USA. ICAD is a forum for presenting research on the use of sound to display data, monitor systems, and provide enhanced user interfaces for computers and virtual reality systems. It is unique in its singular focus on auditory displays, and the array of perception, technology, design and application areas that these encompass. Like its predecessors, ICAD '97 will be a single-track conference. Attendance is open to all, with no membership or affiliation requirements.

PAPER SUBMISSIONS:
The technical papers are a crucial component of the ICAD conference. Papers are solicited for all aspects of auditory display including (but not limited to) the following topics:

- Sonification (data representation through audio)
- Audio on the World Wide Web
- Audio Access for the Visually Impaired
- Sound in Immersive Environments
- Sound in Human-Computer User Interfaces
- Tools and Systems to support auditory display

These themes can be approached from several perspectives, and ICAD provides a forum for open discussion to bridge gulfs between, for example, research and design, science and technology, perception and acoustics. Interdisciplinary exchange is supported with a single-track technical program. For those new to ICAD, it would be useful to examine Auditory Display, (G. Kramer, ed.), Reading MA;

 ISSN 1071-4391 ISBN 978-0-9833571-0-0

Addison Wesley, 1994.

Submissions will consist of a 4 page extended abstract. The abstract format should be tailored to the type of project. Submissions of research efforts should include the objective, methodology, and results. Submissions of applications and designs should include the goals, users, development process, and evaluation. Since audio demonstrations are an important component of ICAD, the abstract should include a description of the prospective audio demonstrations.

Submissions can be made by sending 6 copies of the abstract by June 6, 1997 to the address listed above.

Submissions should also include a single cover sheet which contains:
* the paper title
* the full names, affiliations, complete addresses, phone and FAX numbers, and e-mail addresses of the authors
* a 100 word abstract
* a list of up to five keywords

From the submissions, the program committee will invite long (30 minutes) and short (15 minute) presentations. If there is a preference for one of these, please indicate.

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< JIM' 97 - Journees d' Informatique Musicale >

Grame
9, rue du Garet
BP 1185
69202 LYON Cedex 01
Tel. +33 (0)4 720 737 00
Fax. +33 (0)4 720 737 01
Email: jim97@rd.grame.fr
URL: http://www.grame.fr/jim97

Bibliotheque de la Part-Dieu, Lyon - France
June 6 - 7, 1997

The JIM computer music conference aims to gather researchers in computer music and musicians who use computers as a means of expression or as a tool for composition, in order to present the most advanced researches and their development prospects. Papers will be presented concerning the following fields:

- formalization, representation and modelling of musical knowledge
- software and hardware systems for interactive music
- musical performance modelling and simulation
- systems and environments for sound synthesis and sound processing.
- real-time systems for computer music
- sound spatialisation and acoustic modelling
- software and hardware systems for musical performance
- environments and languages for musical composition

The JIM' 97 also includes the concert "de France et d' Allemagne", given on June 6, at salle Rameau - Lyon, by the Ensemble Orchestral Contemporain.

Practical information:
The JIM' 97 will be held at:
Bibliotheque de la Part Dieu
30 Bvd Marius Vivier Merle
69003 Lyon

The concert “de France et d’Allemagne” will be held at:
  Salle Rameau.
  5 Rue Hyppolyte Flandrin
  69001 Lyon

Information concerning accommodation is available on the JIM Web server at: <http://www.grame.fr/jim97/infos.html>

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< Sonic Circuits V Electronic Music Festival >

Philip Blackburn
ACF-SC, 332 Minnesota Street, E-145
Saint Paul, MN 55101-1300, USA.
For more information:
Tel: (612) 228-1407
Fax: (612) 291-7978
Email: compfrm@maroon.tc.umn.edu
URL: http://www.umn.edu/nlhome/m111/compfrm

Connect with the circuit:
Be on a CD, broadcast around the world;
Receive multiple diffusions of your work across the US and abroad;
Produce your own festival event; we will facilitate your programming.

Just send in your electronic musical work (if you plugged something in to make it, it qualifies - style no object). Over 100 composers have been programmed since 1993.

Sonic Circuits, now in its fifth year, is a festival with a difference; it comprises a caravan of curated works which travels the world to form the basis for many events throughout the season. Any musical works which involve electronic technology (e.g. works for electro-acoustic tape, live performance with electronics, computer pieces, video art...) may be submitted for program consideration. The selected works receive multiple performances at venues across the globe and may be featured on the highlights CD which is sent to numerous radio stations.

The CD, video-compilation, scores and lists of live acts are sent to each venue as a program framework, which may then be supplemented by locally produced material.

The Sonic Circuits season begins in September, 1997 and continues throughout the year. It is easy for you to host a leg of this international festival: simply contact ACF for complete details. Schools, theaters, lofts, galleries, bars construction sites and courtyards have all been home to presentations. Minimum requirements: PA system, playback equipment (video projector and lighting desirable). Pre-recorded program material will be sent to you in October: mix it up with student work or live performers and you have a show.

Submissions
Please submit one work for:
- Audio/video tape;
- Works with a visual and/or live component (musical performers, computer, film, slides, dance, actors, etc.);
- Works appropriate for ISDN-, phone-line hook-ups, the Internet, sound-sculptures or installations.

Entries will be reviewed by a panel of musicians, technically knowledgeable and familiar with a range of musical styles.

 ISSN 1071-4391 ISBN 978-0-9833571-0-0

Eligibility:
Open to all composers worldwide. American Composers Forum membership is not required, but you are welcome to join.

Selection Criteria:
Artistic quality of the work; Sonic Circuits seeks to encourage experimental and innovative uses of the electronic medium.
Technical quality of the work; Skillful use of the technology will be favored.
Appropriateness of duration and format; Programming considerations often favor works less than 15 minutes duration, but longer works will be considered.

Postmark Deadline: July 15, 1997

Sites for Sonic Circuits IV, 1996-97 season:
St. Cloud State University; The Music Gallery/ Inter/Access/CIUT, Toronto; Intermedia Arts, Minneapolis; Audible Visions, Boston; Lunar Cabaret,Chicago; Indiana University South Bend; PICA-Perth, Western Australia; Newsense Intermedium, Tacoma; Oberlin College, Ohio; CSPS, Cedar Rapids, Iowa; and hundreds of radio stations.
****
< Invitation / Call For Works
International Summer Meeting Of Electroacoustic Music In Sarvar >

HEAR Studio of the Hungarian Radio
Ms. Judith Toth
Brody Sandor u. 5-7
H-1800 Budapest, Hungary
Tel.: +361 138 7874
Fax: +361 138 7450
Email: hear@prosi.radio.hu

Place: Castle "Nadasdy var" in Sarvar, Hungary.
Address: Sarvar, Varkerulet 1. H-96000 (Sarvar is a small town in West-Hungary, about 200 km far from Budapest and Vienna alike).

Date: From July 27 to August 3, 1977

The Electroacoustic Music Studio of the Hungarian Radio (HEAR Studio) and the Austrian Society for Electroacoustic Music (GEM) invite composers from all over the world to attend this meeting as well as to send proposals of works to be performed.

Chamber music involving electronics (tape or live-electronics) and any combination of the following instrumental setting are welcome: 2 flutes, 1 clarinet, 1 bassoon, 1 trumpet, 1 trombone, 1 harp, 2 violins, 1 viola, 1 cello, 1 double bass, 1 soprano, 1 mezzo-soprano. Additional instruments could eventually be suggested (e.g. synthesizers, percussion, hurdy-gurdy). Tape music solo is also welcome.

This is a very good opportunity to get in touch with new instrumental electroacoustic music, staying for a couple of days in the charming surroundings of the Castle "Nadasdy var".

The participation on the meeting and the entrance for all concerts are free.

Work proposals will be accepted until JUNE 15, 1997 to the same address. The pieces received earlier have more chance to be performed.

The meeting is sponsored by the KulturKontakt-Austria, the Austrian Secretary of Arts, the Community of Sarvar and the HEAR Studio of the Hungarian Radio, with the participation of the EAR Ensemble (Budapest) and the NewTonEnsemble (Vienna).

Artistic direction is by Istvan Szigeti (Hungary) and Igor Lintz-Maues (Austria).

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ACKNOWLEDGMENTS

LEA and Leonardo/ISAST gratefully acknowledges Interval Research Corporation for its continuing support of Leonardo Electronic Almanac.

LEA WORLD WIDE WEB AND FTP ACCESS

The LEA Word Wide Web site contains the LEA archives, including all back issues, and the Leonardo Electronic Gallery. The Profiles and Feature Articles have been extracted from the back issues, and reside in their own sections of the site. It is accessible using the following URL:

http://www-mitpress.mit.edu/LEA/home.html
http://mitpress.mit.edu/e-journals/LEA/ (as of June 10, 1997)

Back issues, submission guidelines and LEA Gallery files are available via ftp anonymous, using the following method:

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ftp mitpress.mit.edu
login: anonymous
password: your_email_address
cd pub/Leonardo/Leonardo-Elec-Almanac
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LEA PUBLISHING & SUBSCRIPTION INFORMATION

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Minneapolis, MN 55414-1318
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Leonardo Electronic Almanac is published by:

The MIT Press Journals

55 Hayward Street
Cambridge, MA 02142 USA

< Ordering Information >

Leonardo Electronic Almanac is $15 to Leonardo/ISAST members and to subscribers to the journal Leonardo. The rate for Non-Leonardo subscribers is $30.00

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