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        |  PROFILES    |
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< YOULAN Long Winding Valley >

Kui Dong and Ruth Ecland
Email: kui@ccrma.Stanford.EDU

Project Description

Youlan, a winding journey of exploration, is a term derived from
classic Chinese poetry and music. The word connotes elements of the
excitement of discovery, the lure of the unknown, and the elevation
of the ordinary to a place of peak experience. Characters from
Peking Opera saturated in auspicious red, the color of blood, life-
force and supreme magic power are guides along this journey through
a winding valley where darkness is punctuated by light, and images
dissolve their boundaries and merge to birth new visions. The music
is the map through this world, providing both context and direction.
Samplings of ancient Chinese instruments have been transformed
through digital processing and manipulation to create new sound
structures that are evocative of their origins.

Many of the images allude to the talismans of ancient Taoism. Taoist
graphic art made no distinction between the real and the imaginary.
In fact, it was designed to trigger the active use of the
imagination to interpret abstraction, just as the almost bare stage
of traditional Chinese opera is intended to be filled by the
imagination of the spectator. In Youlan, sound and image operate
together to offer viewers an experience of perception that will be
uniquely their own. As in the dream state of synthesis, elements of
the real world become raw material for the mind to manufacture each
individual's own vocabulary of symbols. Ruth Eckland and Kui Dong
have been collaborating since 1993 to create experiential
environments of image and sound. Just as the music and visual art
weave together to more fully define and illuminate each other, so do
the different cultural perspectives and life experiences of the two
artists enhance each other's vision.

Time: approximately 11 minutes

Kui Dong

Kui Dong was born (1967) in Beijing, China. She expects her doctoral
degree in composition at Stanford University this June. Her
compositions and commissions include a 3-act ballet for orchestra,
chamber works, and works for electronic-acoustics and multi-media.
They have been performed and broadcast by KPFA (Berkeley) New Radio
Performance Art (NY), American Music Festival, Other Minds Music
Festival, Pacific Contemporary Music Festival(LA)Central Ballet of
China, Windsor Symphony(Canada), Alea III (Boston), Composers
Inc.(SF), Orchestra symphony of Central Ballet of China, Society of
Composers Inc., Beijing Dance Institute, Meridian Gallery
(SF),Visual Symbols (SJ), LIMP(Argentina).

Kui Dong has received a number of international/national prizes
include 96 Prix Ars Electornica (honorary mention) first prizes from
1994 Alea III International composition Prize, Boston, National Art

Song Competition(Beijing), National Dance Music Competition (Beijing), awards from 1995 ASCAP Grants to Young Composers, 1995 Djaressi foundation for Art, 1995 Santa Clara Award for composer, 1993 Asia-Pacific National Fund and Stanford University. She is currently working on her first chamber opera "Cess, after Turandot". Kui will join the composition faculty at Dartmouth this fall.

Ruth Ecland

Ruth Eckland is a photographer and installation artist whose work has been shown in San Francisco, California at Meridian Gallery, Yerba Buena Center for the Arts, and the Magic Theater; in San Jose, California at the San Jose Institute of Contemporary Art, WORKS, San Jose State University, and the San Jose Art League; in Palo Alto, California at the Photographer's Gallery, the Anita Seipp Gallery, and Stanford University's Institute for Research on Women and Gender; and in Seattle, Washington at Suspect Gallery. She has participated in panel discussions on photography, including "Pushing the Edges of the New Photographic Media" at Cabrillo College , and "Unbound and Exposed: Alternative Photographic Processes," at San Jose State University, and has collaborated with other artists, dancers, musicians and composers including two from Stanford University's Center for Computer Research in Music and Acoustics.

Her unique style utilizes images and light as if they were layers of paint on a transparent canvas, and has led her to devise a method of projection on multiple scrims that creates a three dimensional, "holographic" effect.
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    |   LEONARDO DIGITAL REVIEWS   |
    |         April       1997        |
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Editor: Roger Malina
Coordinating Editor: Kasey Rios Asberry
Editorial Advisors: Chet Grycz, Judy Malloy, Annick Bureaud, Marc Battier

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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< Book Review: The Split and the Structure
Twenty-Eight Essays, by Rudolf Arnheim >

University of California Press
Berkeley, CA
1996. 184 pp. Paperback. ISBN 0-520-20478-6.

Reviewed by Istvan Hargittai
Email: hargittai@ch.bme.hu

This is the fourth volume of Rudolf Arnheim's essays. More than two-thirds of the 28 pieces were originally published in the 1990s, the latest in 1996, and there are also earlier pieces, the earliest from

1966. Three of the essays are not dated and may have been prepared for this volume. Only a few of the essays will be commented upon in this review.

Arnheim writes in the essay "A Maverick in Art History" that during his 50 years of having been involved in the field he has gradually changed his observation point. In the early years he was exploring the arts for convenient illustrations, only to move eventually into the territory of the arts themselves. What is truly remarkable, though, is that he has done so while keeping up with the sciences and integrating scientific concepts and discoveries into his work. Arnheim is himself an example of an exception to what C.P. Snow labeled as the split of the "Two Cultures." There is no more appropriate place than Leonardo to take notice of this achievement. In the foreword and in the introductory essay, "The Split and the Structure," Arnheim explains how artists grope for structure in order to shape powerful and enlightening images, and how the scientist's search for truth is a search for structure. Nobel laureate physicist Eugene Wigner's description of the most important method of science comes to mind:

Science begins when a body of phenomena is available which shows some coherence and regularities; that science consists in assimilating these regularities and in creating concepts which permit expressing these regularities in a natural way. . . . It is this method of science rather than the concepts themselves (such as energy) which should be applied to other fields of learning.

This quotation is from a brief speech Wigner gave during the Nobel ceremonies in 1963 in Stockholm. With this statement Wigner was also paying tribute to his teacher Michael Polanyi, the physical chemist-turned-philosopher from whom Wigner had originally learned this idea. As Arnheim enumerates the most important properties of structure, such as range/space, interacting forces, growth and dynamics, each attribute is treated in such a way that is more general than might be expected from an art historian. As he speaks of the range of structure as determined by the amount of space a structure needs and can accommodate for its best functioning, it is obvious that space is much more to him than mere abstraction. With his observation that the structure---occupying the available space---is held by interacting forces, we are reminded of Buckminster Fuller's physical geometry. Fuller was far from being a (natural) scientist but his design (science) was all about structure. There is also excellent resonance between Arnheim's comments about space and Francesco Borromini's articulation of space. Structure and split are discussed at various levels by Arnheim. He gives much more emphasis to the structure than to the split. Yet the two do not appear disparate, and we get a glimpse of how the split, in this case in a non-abstract manner, may be an integral part of structure. This is represented by Arnheim's quoting the story of the Chinese cook who never has to sharpen his knife because when he has to carve the meat of an ox, he puts his hand on it, presses with his shoulder, his foot and his knee, and right away the skin splits and the knife slides smoothly between the natural sections of the body. In "The Way of Crafts" Arnheim relates his experience with Japanese structures. He notes the affinity of Japanese design to nature's own way---the best possible space utilization. He also remarks on the close relationship between functionality and beauty in the best designs. Arnheim notes that he was fortunate that his year of teaching in Japan in 1959 was early enough to allow him to witness much of the tradition of the arts shaping both the style of daily living and the objects of practical use instead of being confined to museums. More than three decades later I found that this is still

the case in Japan, probably less so than in 1959 but noticeably more so than in Western cultures. I find this important to stress because a visit to Japan still has rewards in such aspects.

Arnheim mentions the Japanese tendency of giving exposure to unpretentious shape and his example is drawn from the Katsura palace in Kyoto. In fact the Katsura Imperial Villa is an almost inaccessible place for Japanese (especially) and foreign visitors alike. On special occasions there are organized tours for small groups of foreigners, and this is how I got to see it, as I happened to be there on the right day and to have the right connections. But for any practical purpose, it can be considered closed to the general public. However, examples of using natural forms and at least seemingly untreated materials abound in Japan.

Invoking the Katsura Imperial Villa for illustrating something that could have been done much more easily is an example of what I find at places a little awkward in this essay volume. Some examples in the discussion convey elitism, others are simply unfortunate.

A case in point is in the otherwise very interesting discussion of order and disorder in "From Chaos to Wholeness." Following some criticism for the lack of comprehensible order in some artworks, Arnheim proceeds to speak about locally arising troubles when elements are not clearly identified as belonging either apart or together. He quotes one example, Henri Matisse's "La Danse," of which two versions are known. The first is from early 1909 and is in the Museum of Modern Art, New York. The second was done a few months later and is at the Hermitage in St. Petersburg. The essay reproduces the earlier version but Arnheim's comments are directed at both. The pictures show a round dance of five figures holding hands. Arnheim complains about a chaotic disorientation resulting from the hands of the frontal figures interfering in their reaching for each other by the knee of the figure behind them. I do not think that there is any confusion about which of the dancers are in front and which are behind, though somehow the gap between the two hands conveys the feeling of the dance slowing down unnecessarily at that point. This may have bothered Matisse as well: in the more elaborate second version of the painting, the two hands touch or almost touch; behind these hands the other dancer is in a slightly different position and is more sharply drawn than in the first version (in fact, so is the whole picture). To me the first version appears as if it were a study for the second. Although the first is not ambiguous as far as which dancer is in front and which is behind, whatever ambiguity there may be is absent in the second version. I am surprised that Arnheim did not make the distinction between the two versions of "La Danse" in this respect.

All in all, these 28 essays are as many gems to read and muse about for experts and mere art-lovers alike.
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< Book Review: Essays on the Anthropology of Reason >

Reviewed by Roger F Malina
Email: mason@mitpress.mit.edu

Paul Rabinow has worked as an ethnographer on two high profile bio-technology projects. The first was located at Cetus Corporation, the company which was the site of the invention of the polymerase chain

reaction (PCR) - a technology that allowed rapid amplification and replication of precise sequences of DNA. The second ethographic study was at the Centre d'Etude du Plymorphisme Humain (CEPH) in France, a leading genome mapping center. These studies resulted in two books thus far. The first is "Making PCR: a story of biotechnology" (Chicago: University of Chicago Press, 1996) and the book reviewed here, a collection of essays addressing issues in methodology of contemporary ethnography.

One of Rabinow's aims is to "exoticize the western constitution of reality", emphasize those domains most taken for granted, reposition them as historically particular and show how their claims to truth are linked to social practices, and hence become effective forces in the social world. Rabinow places himself firmly in the camp of those who are constructing a critique and exposition of science as a social construct. He is in the eye of the storm currently raging in academic institutions concerning the nature of science in the context of contemporary literary, linguistic and philosophical debate. These essays were written during the time when he was carrying out his ethnographic projects in biotechnology institutions. They are enlivened by a sense of a battle in progress, of the observer observing himself.

Daniel Cohen, the director of CEPH, viewed the involvement of Rabinow in their work as an "experiment". The scientists were keenly aware that their scientific work in molecular biology and genetics was entering uncharted ethical and social domains and he was eager to establish a "philosophical observatory" inside the laboratory. The experiment proved to be both an ethnographics study, as well as an engagement in the academic arguments that are raging in contemporary humanistic disciplines, particularly in social anthropology.

Some of these essays may be distant from the usual preoccupations of Leonardo readers but this is because Rabinow brings new considerations to the art/technology discussion. It would be of interest to have other ethnographers involved in some of the initiatives now under way that seek to create the new cultural matrix.

A few elements that set me thinking included Rabinow's discussion of the importance of friendship as a primary locus of thinking. His analysis could be carried over to the way that use of the internet is leading to creation of intellectual communities, where the social bond of friendship is a key element in defining a scholarly neighborhood. A second is his discussion on the role of ethics in science. Before Descartes (as argued by Foucault and others), ethics and knowledge were intimately bound. "Before Descartes one could not be impure, immoral and know the truth. With Descartes, direct evidence is enough". This puts into sharp focus the debate on the ethical issues arising from new biology and biotechnology. There are indeed two orthogonal ways of viewing science: the one extreme is to view science as a neutral activity that can be applied for good or bad purposes - that once the scientists have done their work, the lawyers, politicians and ethicists go to their task. The other way is to argue that scientists should be trained as ethical beings, by whom only certain kinds of scientific inquiry will be emphasized.

Other topics addressed in the essays include French socialist urban planning in the 30s, debates about the nature of evidence in DNA fingerprinting and the implications on socially constructed groups of gene technology (the creation of social groups defined by their genetic predispositions rather than their race or ethnicity - biosocial groups), and the emergence of a third culture.

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< Book Review: The Accused - The Dreyfus Trilogy >

Written by George R. Whyte
Inter Nationes,
Bonn: 1996;
34.95 $US; 58-DM

Reviewed by: Henry Rapoport
Email: David@CChem.Berkeley.EDU

"The Accused - The Dreyfus Trilogy," created by George R. Whyte,
focuses on the Dreyfus Affair and its deeper implications as it
addresses the conscience of mankind. The year 1994 marked the
Centenary of the conviction for high treason of the innocent Alfred
Dreyfus, a Jewish Captain in the French General Staff. In
commemoration of this historic event, George R. Whyte, a British
writer of Hungarian Jewish extraction, completed this Dreyfus
Trilogy, comprising an Opera, "The Dreyfus Affair," a Dance-Drama,
"Dreyfus-J'Accuse," and a Musical Satire, "Rage and Outrage," all
three works having been first performed during the centenary year.

This book is a treasure with its striking performance photographs,
transparencies, and color reproductions. The unabridged texts of the
Trilogy bring the epoch to life.

A preface to the Trilogy presents a concise description of the
Dreyfus affair and its place in the history of anti-Semitism. This
is accompanied by a Chronology which documents major events as the
virus of hatred and xenophobia has infected the Christian world.

Full exposure is given to the role of Emile Zola as the conscience
of France, the land of human rights. Brief biographical sketches, as
well as photos are included for all the major figures.

The influence of the persecution of Alfred Dreyfus on subsequent
World and European history is the major theme of "The Accused". It
is conveyed profoundly in this book, a work of art, a work of
literature, and a work of history.
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< Book Review: Electronic Culture, Edited by Tim Druckrey >

New York: Aperture, 1996

Reviewed by Joseph Nechvatal
Email: jnech@imaginet.fr

Newsgroups and mailing lists have the advantage of making the path
between writing and reading short and fast, thus creating the
possibility for a form and intensity of intellectual discourse that
can rival the journalistic exchanges in Paris in the 19th century,
or those of Weimar Republic Berlin. The Nettime ZKPs are the fast
condensations of the debates held on this list, and they are good
examples of how the old Gutenbergian medium will slow down and
substantiate the same words and ideas that previously sped across
the wires as data packets. In analogy to the recent discussion of
'Englishes' it might be well worth reminding ourselves of the
different reading habits and forms of intellectual appropriation
associated with the various material forms in which we experience
texts.

The New York photography publishers Aperture have just published a
volume called 'Electronic Culture. Technology and Visual
Representation', edited and introduced by Tim Druckrey. The book

contains 31 essays by European and North American writers and spans half a century of critical writing about culture and technology. For me it was a welcome reminder of the historical dimension of current discussions about culture and technology, and I would here like to just very briefly point to its content which I feel is a very valuable contribution to a slowing down and substantiation of our considerations of digital culture.

The volume is divided into four main sections (History; Representation: Photography and After; Theory; Media/Identity/Culture) and deals with a broad spectrum of issues of technology, media and representation. Roughly speaking, it starts where Walter Benjamin broke off, i.e. where the image becomes associated with digital rather than analogue reproduction, and where technology moves from the industrial into the post-industrial age of cybernetics. And it finishes with the theoretical and cultural impact of VR technologies and electronic networks whose aesthetic impact remains as yet largely unexplored.

Given Druckrey's own and Aperture's special interest in visual representation and photography, the collection places a clear emphasis on digital imaging technologies, from post-photography to VR environments. However, "Electronic Culture" succeeds in placing digital imaging in the wider contexts of the histories of science theory and technology, of cybernetics and the social and political usages of technology, so that it offers not only useful analyses of theories of representation in the digital age, but contributions to a social and technological history of contemporary (visual) culture. On the whole, it is more interested in the art, science and technology complex than in popular culture, and its greatest achievement might lie in making available a series of media theoretical texts that show that there is a significant tradition of thought in this field that does not need McLuhan as its patron saint. It is worth noticing that more than half of the authors in this book are Europeans. In practice, this means that there is very little MIT-style techno-positivism, and a lot of historical and theoretical scrutiny. Two minor complaints: an alphabetical index would have been useful, as would have been quoting the dates of the original publications, not least because it would have created a stronger sense of the chronological parameters of this most recent development in the history of visual culture. However, the book still communicates a clear sense of the historical depth of thinking about the impact of digital technologies in the 20th century, and unlike many of the hype-driven compilations that are hardly more than thematic special issues of art and culture magazines, this is a book that looks beyond the immediate interests of 1996, and that will last. It also makes us curious to read on, to follow certain thematic currents and authors, and to pay more attention to the interrelations between technology, culture and visual representation in an historical perspective. Slowing us down in this way could be a useful, humbling exercise which, if practised more widely, would probably save us from a lot of the intellectual redundancy created because of a lack of historical consciousness.

(Electronic Culture contains texts by Sandy Stone, Vannevar Bush, Martin Heidegger, Hans Magnus Enzensberger, Arthur I. Miller, Jean-Louis Comolli, Bill Nichols, David Tomas, Kevin Robins, Roy Ascott, Raymond Bellour, Kathy Rae Huffman, Kim H. Veltman, Lev Manovich, Vilem Flusser, Florian Roetzer, N. Katherine Hayles, Siegfried Zielinski, Slavoj Zizek, Erkki Huhtamo, David Blair, Louise K. Wilson/ Paul Virilio, Friedrich Kittler, Peter Weibel, Sherry Turkle, Pierre Levy, Hakim Bey, Anne W. Branscomb, Geert Lovink, Critical Art Ensemble.)
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< Exhibit Review: Heat, Light and Space
by Mike and Doug Starn >

Ansel Adams/Friends of Photography Gallery, San Francisco, CA.
Through March 22, 1997
Reviewed by Barbara Lee Williams
Email: delano@pacbell.net

The Starn's installation, "Size of Earth: Illuminated Photoworks",
presents three bodies of work: 'Heliolibri,' small-scale lightboxes
filled with transparent books and glowing images, notably Petrus
Christus's haunting 17th Century portrait, 'Die Jungen Frauen';
'Spectroheliographs,' multiple lightboxes hung in grids, and
incorporating Skylab photos; and 'Amaterasu,' the Starns' first
kinetic piece, a whirling sphere of flashing lights and swinging
iron frames placed behind a large, curved, semi-transparent screen.

Each genre explores the Starn's fascination with human creativity
and the life-giving energy of the sun; their differences suggest a
stylistic and conceptual evolution. The intimate, free-floating
'Heliolibri,' embraces human history through texts including Plato,
Copernicus and scientific studies of optics, encasing these
fragments in radiant light. The grander 'Spectroheliographs,' like
'Some Saint's Fingernail' in which Petrus' maiden, hair in flames,
is framed by an enormous solar flare, move towards abstraction and
greater universal references. Finally, the mesmerizing 'Amaterasu,'
named for the Japanese sun goddess, suggests a primitive satellite,
a symbol of modern creativity, its otherworldliness enhanced by an
audio piece blending Buddhist chants and space-age sound effects.

Within this small, brilliant collection, one work has a distinct,
witty voice. "Assorted Studio Detritus" spreads along the gallery's
rear wall, a tangle of lights, wires, photos and transparencies.
Peering at the individual elements, repeated images emerge --
insects, solar eclipses and flares, snapshots of the New York studio
-- evidence of the Starn's research into nature and space elevated
into a joyful tribute to artistic process.
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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 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, 236 West
Portal Ave, #781, San Francisco, Ca 94127, 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:

mason@mitpress.mit.edu

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 APRIL 1997 >
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             |  PUBLICATIONS   |
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<   The Loom of God:
Mathematical Tapestries At The End Of Time,
by Clifford Pickover >

Pickover, C. (April, 1997)
Plenum Publishing, New York
ISBN 0-306-45411-4
http://www.plenum.com

Cliff Pickover
Email: CLIFF@watson.ibm

Book topics: mathematics, art, mysticism, fractals, science, strange
puzzles, God, comets and cults, and the fate of the universe.

Cliff Pickover has a home page at
http://sprott.physics.wisc.edu/pickover/home.htm which has more
images and information regarding the book.

Here is the book's Table of Contents:

1 Are Numbers Gods?
2 The End of The World
3 Pentagonal Numbers
4 Doomsday: Friday 13, November, A.D. 2026
5 666,666, Gnomons, and Oblong Numbers
6 St. Augustine Numbers
7 Perfection
8 Turks and Christians
9 The Ars Magna of Ramon Lull
10 Death Stars, a Prelude to August 21, 2126
11 Stonehenge
12 Urantia and 5,342,482,337,666
13 Fractals and God
14 Behold the Fractal Quipu
15 The Eye of God
16 Number Caves
17 Numerical Gargoyles
18 Astronomical Computers in Canchal de Mahoma

Here are some blurbs from the flyer.

"As far as I know, Clifford Pickover is the first mathematician to write a book about areas where math and theology overlap. Are there mathematical proofs of God? Who are the great mathematicians who believed in a deity? Does numerology lead anywhere when applied to sacred literature? Pickover covers these and many other off-trail topics with his usual verve, humor, and clarity. And along the way the reader will learn a great deal of serious mathematics."
- Martin Gardner

"Pickover has done it again, with a marvelously entertaining, historical romp through the unexpected connections between mathematics and mysticism."
- Paul Hoffman, President/Editor-in-Chief, Discover magazine

PREFACE

"I have always thought it curious that, while most scientists claim to eschew religion, it actually dominates their thoughts more than it does the clergy."
- Astrophysicist Fred Hoyle

IS GOD A MATHEMATICIAN?

"Mathematical inquiry lifts the human mind into closer proximity with the divine than is attainable through any other medium."
- Hermann Weyl (1885-1955)

Mathematics and mysticism have fascinated humanity since the dawn of civilization. Throughout history, numbers held certain powers that made it possible for mortals to seek help from spirits, perform witchcraft, and make prayers more potent. Numbers have been used to predict the end of the world, to raise the dead, to find love, and prepare for war. Even today, serious mathematicians sometimes resort to mystical or religious reasoning when trying to convey the power of mathematics.

Has humanity's long-term fascination with mathematics arisen because the universe is constructed from a mathematical fabric? In 1623, Galileo Galilei echoed this belief by stating his credo: "Nature's great book is written in mathematical symbols." Plato's doctrine was that God is a geometer, and Sir James Jeans believed God experimented with arithmetic. Newton supposed that the planets were originally thrown into orbit by God, but after God decreed the law of gravitation, the planets continued without further need of divine guidance.

Is God a mathematician? Certainly, the world, the universe, and nature can be reliably understood using mathematics. Nature _is_ mathematics. The arrangement of seeds in a sunflower can be understood using Fibonacci numbers (1, 1, 2, 3, 5, 8, 13...) named after the Italian merchant Leonardo Fibonacci of Pisa. Except for the first 2 numbers, every number in the sequence equals the sum of the two previous. Sunflower heads, like other flowers, contain two

families of interlaced spirals -- one winding clockwise, the other counter clockwise. The number of seeds and pedals are almost always Fibonacci numbers.

The shape assumed by a delicate spider web suspended from fixed points, or the cross-section of sails bellying in the wind, is a catenary -- a simple curve defined by a simple forumula. Seashells, animal's horns, and the cochlea of the ear are logarithmic spirals which can be generated using a mathematical constant known as the golden ratio. Mountains and the branching patterns of blood vessels and plants are fractals, a class of shapes which exhibit similar structures at different magnifications. Einstein's $E = m c ** 2$ defines the fundamental relationship between energy and matter. And a few simple constants -- the gravitational constant, Planck's constant, and the speed of light -- control the destiny of the universe. I do not know if God is a mathematician, but mathematics is the loom upon which God weaves the fabric of the universe.

MARILYN VOS SAVANT AND A UNIVERSE CALLED JUMBLE

"Physicists are excited about discovering how reality behaves in terms of mathematical descriptions. This process is akin to discovering some hidden presence in the behavior of the universe -- a gnosis. In this sense, physics is the inheritor of the tradition of Pythagoras."
- Anonymous IBM physicist

Marilyn vos Savant is listed in the _Guinness Book of World Records_ as having the highest IQ in the world -- an awe-inspiring 228. She is author of several delightful books and wife of Robert Jarvik, M.D., inventor of the Jarvik 7 artificial heart. Her column in _Parade_ magazine is read by 70 million people every week. One of her readers once asked her, "Why does matter behave in a way that is describable by mathematics?" She replied:

"The classical Greeks were convinced that nature is mathematically designed, but judging from the burgeoning of mathematical applications, I'm beginning to think simply that mathematics can be invented to describe anything, and matter is no exception."

Marilyn vos Savant's response is certainly one with which many people would agree. However, the fact that reality can be described or approximated by _simple_ mathematical expressions suggests to me that nature has mathematics at its core. Formulas like "$E = m c ** 2$," "$F = m a$," "$1 + e ** (i*pi) = 0$," and "$lambda = h / m v$" all boggle the mind with their compactness and profundity. "$E = m c**2$" is Einstein's equation relating energy and mass. "$F = m a$" is Newton's second law: force acting on a body is proportional to its mass and its acceleration. "$1 + e ** (i*pi) = 0$", is Euler's formula relating three fundamental mathematical terms: e, pi and i . The last equation, "$lambda = h / m v$" , is De Broglie's wave equation indicating matter has both wave and particle characteristics. Here the Greek letter lambda, lambda , is the wavelength of the wave-particle, and m is its mass. These examples are not meant to suggest that _all_ phenomena, including subatomic phenomena, are described by simple-looking formulas; however, as scientists gain more fundamental understanding, they hope to simplify many of the more unwieldy formulas.

I side both with Martin Gardner and Rudolf Carnap who I interpret as saying: nature is almost always describable by simple formulas not because we have invented mathematics to do so but because of some hidden mathematical aspect of nature itself. For example, Martin Gardner writes in his classic 1985 essay "Order and Surprise":

"If the cosmos were suddenly frozen, and all movement ceased, a survey of its structure would not reveal a random distribution of parts. Simple geometrical patterns, for example, would be found in profusion -- from the spirals of galaxies to the hexagonal shapes of snow crystals. Set the clockwork going, and its parts move rhythmically to laws that often can be expressed by equations of surprising simplicity. And there is no logical or _a priori_ reason why these things should be so."

Here Gardner suggests that simple mathematics governs nature from the molecular to galactic scales.

Rudolf Carnap, an important 20th-century philosopher of science, profoundly asserts:

"It is indeed a surprising and fortunate fact that nature can be expressed by relatively low-order mathematical functions."

To best understand Carnap's idea, consider the first great question of physics: "How do things move?" Imagine a universe called JUMBLE where Kepler looks up into the heavens and finds that most planetary orbits cannot be approximated by ellipses but rather by bizarre geometrical shapes that defy mathematical description. Imagine Newton dropping an apple whose path requires a 100-term equation to describe. Luckily for us, we do not live in JUMBLE. Newton's apple is a symbol of both nature and simple arithmetic from which reality naturally evolves.

ARE MATHEMATICS AND RELIGION SEPARATE?

"Had Newton not been steeped in alchemical and other magical learning, he would never have proposed forces of attraction and repulsion between bodies as the major feature of his physical system."
- John Henry, _Let Newton Be!_

In our modern era, God and mathematics are usually placed in totally separate arenas of human thought. But as this book will show, this has not always been the case, and even today many mathematicians find the exploration of mathematics akin to a spiritual journey. The line between religion and mathematics becomes indistinct. In the past, the intertwining of religion and mathematics has produced useful results and spurred new areas of scientific thought. Consider as just one small example numerical calendar systems first developed to keep track of religious rituals. Mathematics in turn has fed back and affected religion because mathematical reasoning and "proofs" have contributed to the development of theology.

In many ways, the mathematical quest to understand infinity parallels mystical attempts to understand God. Both religion and mathematics attempt to express relationships between humans, the universe, and infinity. Both have arcane symbols and rituals, and impenetrable language. Both exercise the deep recesses of our minds and stimulate our imagination. Mathematicians like priests seek "ideal", immutable, nonmaterial truths and then often try to apply these truths in the real world. Some atheists claim another similarity: mathematics and religion are the most powerful evidence of the inventive genius of the human race.

Of course, there are also many _differences_ between mathematics and religion. For example, many of religions' main propositions are impossible to prove, and religion often relies on faith unaffected by reason. In addition, while various religions _differ_ in their

beliefs, there is remarkable _agreement_ among mathematicians. Philip Davis and Reuben Hersh in _The Mathematical Experience_ suggest "all religions are equal because all are incapable of verification or justification." Similarly, certain valid branches of mathematics seem to yield contradictory or different results, and it seems that there is not always a "right" answer....

HOW MUCH MATHEMATICS CAN WE KNOW?

"Einstein's fundamental insights of space/matter relations came out of philosophical musings about the nature of the universe, not from rational analysis of observational data -- the logical analysis, prediction, and testing coming only after the formation of the creative hypotheses."
- R. H. Davis, _The Skeptical Inquirer_, 1995

We can hardly imagine a chimpanzee understanding the significance of prime numbers, yet the chimpanzee's genetic makeup differs from ours by only a few percentage points. These minuscule genetic differences in turn produce differences in our brains. Additional alterations of our brains would admit a variety of profound concepts to which we are now totally closed. What mathematics is lurking out there which we can never understand? How do our brains affect our ability to contemplate God? What new aspects of reality could we absorb with extra cerebrum tissue? And what exotic formulas could swim within the additional folds? Philosophers of the past have admitted that the human mind is unable to find answers to some of the most important questions, but these same philosophers rarely thought that our lack of knowledge was due to an organic deficiency shielding our psyches from higher knowledge.

If the Yucca moth, with only a few ganglia for its brain, can recognize the geometry of the yucca flower from birth, how much of our mathematical capacity is hardwired into our convolutions of cortex? Obviously specific higher mathematics is not inborn, because acquired knowledge is not inherited, but our mathematical capacity _is_ a function of our brain. There is an organic limit to our mathematical depth.

How much mathematics can we know? The body of mathematics has generally increased from ancient times, although this has not always been true. Mathematicians in Europe during the 1500's knew less than Grecian mathematicians at the time of Archimedes. However, since the 1500's humans have made tremendous excursions along the vast tapestry of mathematics. Today there are probably around 300,000 mathematical theorems proved each year.

In the early 1900's, a great mathematician was expected to comprehend the whole of known mathematics. Mathematics was a shallow pool. Today the mathematical waters have grown so deep that a great mathematician can know only about 5% of the entire corpus. What will the future of mathematics be like as specialized mathematicians know more and more about less and less until they know everything about nothing?

THE WILD SIDE OF MATHEMATICS

"More significant mathematical work has been done in the latter-half of this century than in all previous centuries combined."
- John Casti, _Five Golden Rules_

During their early days, both science and math have been connected with fictitious beliefs. Astronomy was connected with astrology, chemistry with alchemy, and mathematics with numerology. _The Loom

of God_ does not neglect this wild side of mathematics and its effect on human belief systems. The initial emphasis will be on Pythagoras, the ancient Greek mathematician whose ideas continue to thrive after three millennia of mathematical science. Philosopher Bertrand Russell once wrote that Pythagoras was intellectually one of the most important men that ever lived, both when he was wise and when he was unwise. Pythagoras was the most puzzling mathematician of history because he founded a numerical religion whose main tenants were transmigration of souls and the sinfulness of eating beans, along with a host of other odd rules and regulations. To the Pythagoreans, mathematics was an ecstatic revelation. The Pythagoreans, like modern day fractalists, were akin to musicians. They created pattern and beauty as they discovered mathematical truths. Mathematical and theological blending began with Pythagoras, and eventually affected all religious philosophy in Greece, played a role in religion of the Middle Ages, and extended to Kant in modern times. Bertrand Russell felt that if it were not for Pythagoras, theologians would not have sought logical proofs of God and immortality.

HARMONY OF MATHEMATICS AND RELIGION

"An intelligent observer seeing mathematicians at work might conclude that they are devotees of exotic sects, pursuers of esoteric keys to the universe."
- P. Davis and R. Hersh, _The Mathematical Experience_

"Pure mathematics is religion."
- Friedrich von Hardenberg, circa 1801

The emphasis of this book is on _theomatics_ -- a word I coined in 1995 to denote the blending of mathematics and religion. I also discuss many end-of-the-world scenarios -- from ancient theological prophesies to modern astrophysical predictions. Numbers have played a central role in both religious and scientific apocalypses. To start you on your journey, we will first trace the logic of mathematics far back in time and examine humanity's search for ultimate answers to the mystery of existence, God, and the universe. The initial focus is around 550 B.C. because numbers had an auspicious reign in ancient Greece, especially for the Pythagoreans, the secret society devoted to exploring the mysteries of numbers. You will soon realize that both ancient and modern mathematicians trespass on territory that is often considered the exclusive province of religion.

There is a harmony in the universe that can be expressed by whole numbers. Numerical patterns describe the arrangement of florets in a daisy, the reproduction of rabbits, the orbit of the planets, the harmonies of music, the relationships between elements in a periodic table. On the controversial side, mathematics and religion have often come together to predict the End of the World, and numbers have been worshipped like gods. In this book, I'll give some unusual examples of this juxtaposition of God and mathematics, and also describe some of the current astronomical theories for the End of the Earth.

Philosophers and writers make statements about mathematics that have religious undertones. For example, author Alan Watts has described mathematicians in the following way:

"The pure mathematician is much more of an artist than a scientist. He does not simply measure the world. He invents complex and playful patterns without the least regard for their practical applicability."

Through history, many philosophers and skeptics have probably made similar statements about religion.

Similarly, Aristotle describes mathematics in his _Metaphysics_: "Those who claim that the mathematics is not concerned with goodness and beauty miss the truth." Notice that if you were to examine the writings of many philosophers, and replace "mathematics" with the word "religion", their statements would be equally powerful and comprehensible. Why is this so? (For example, try this with Aristotle's quotation by replacing "mathematics" with "religion".) Is it because both mathematics and religion both start with a belief (or axiom) system?

One of my favorite quotations describing the mystical side of science comes from Richard Power's _The Gold Bug Variations_:

"Science is not about control. It is about cultivating a perpetual condition of wonder in the face of something that forever grows one step richer and subtler than our latest theory about it. It is about reverence, not mastery."

Again notice how the word "science" is easily replaced with "religion" or even "art."

THE END OF THE WORLD

"We, while the stars from heaven shall fall, And mountains are on mountains hurled. Shall stand unmoved amidst them all, And smile to see a burning world."
- Millerite Hymn, 1843

Throughout our history, various prophets of doom have predicted the end of the world using arcane mathematical manipulations. The End takes many forms: a huge comet crashing into the Earth, California sliding into the sea, the Apocalypse predicted in the Book of Revelation. No matter what form Doomsday takes, one thing is clear: the End of The World did not only intrigue ancient religious prophets: interest is still strong in our modern society. Just turn on your TV any Sunday morning to find some preacher telling you the world is about to end. Popular books predicting imminent disaster always find large and enthusiastic audiences. Today, in the United States there are probably more "doomists" than there ever were in some medieval or Roman town. Some fundamentalist Christians not only believe that there will be a Judgment Day when the world will end, but they also believe that the world _should_ end.

The doomists have never been right -- but one day they will. Certainly the world will come to an end some time in the future, but more on this subject later...

TRAVEL THROUGH TIME AND SPACE

"There is no question about there being design in the Universe. The question is whether this design is imposed from the Outside or whether it is inherent in the physical laws governing the Universe. The next question is, of course, who or what made these physical laws?"
- Ralph Estling, _The Skeptical Inquirer_, 1993

This book will allow you to travel through time and space, and you needn't be an expert in theology or mathematics. To facilitate your journey, I start most chapters with a dialog between two quirky explorers who are interested in God and mathematics. You are Chief

Historian of an intergalactic museum floating in outer space, a teacher and historian. Your able student is a scolex, a member of a race of creatures with bodies made of diamond. Their hard bodies shields them from injury. Your personal scolex, Mr. Plex, helps you perform calculations and protects you from the dangers of time travel.

Prepare yourself for a strange journey as _The Loom of God_ unlocks the doors of your imagination with thought-provoking mysteries, puzzles, and problems on topics ranging from Stonehenge to Armageddon. A resource for science-fiction writers, a playground for computer hobbyists, an adventure and education for beginning students in theology, history, astronomy and mathematics, each chapter is a world of paradox and mystery. Often various experiments in each chapter are accompanied by short listings of computer code in the Appendix. Computer hobbyists may use the code to explore a range of topics: from fractals, to asteroid cratering, to perfect numbers. However, the brief computer programs are just icing on the cake. Those of you _without_ computers can still enjoy the journey and conduct a range of thought experiments. Readers of all ages can study theomatics using just a calculator.

As in all my previous books, you are encouraged to pick and choose from the smorgasbord of topics. Many of the chapters are brief and give you just a flavor of an application or method. Often, additional information can be found in the referenced publications. In order to encourage your involvement, I provide computational hints and recipes for producing the computer-drawn figures. For some of you, program code will clarify concepts.

Some information is repeated so that each chapter contains sufficient background information, but I suggest you read the chapters in order as you and Mr. Plex gradually build your knowledge. The basic philosophy of this book is that creative thinking is learned by experimenting.

CLOSING

"An equation for me has no meaning unless it expresses a thought of God."
- Ramanujan (1887 - 1920)

"This tension between the finite and the infinite, and its conciliation, became the driving motive of Greek investigation." - Hermann Weyl (1885-1955)

Let me wrap up by mentioning some other topics you will encounter in this book as you journey from the ancient past to the far future. You'll meet enigmatic Greek warriors, Kabalists, St. Augustine, and Ramon Lull. You'll construct numerical gargoyles and visit prehistoric number caves. You'll hold an Incan fractal quipu in your hand, and discuss Doomsday. Strange numbers will surround you: pentagonal, perfect, oblong and golden....

The oldest mathematical tablets found by archeologists date back to 2,400 B.C, and I assume that humanity's urge to create and wonder about mathematics goes back to the earliest protohumans. Numbers were used by the ancient Amerindians, Sumerians, Babylonians, Chinese, Egyptians, and Indians. The Assyrians and Babylonians even assigned sacred deity-numbers to astronomical objects: our Moon was 30 and Venus was 15. Unfortunately, if we attempt to go back beyond the invention of writing, sometime around 6000 years ago in Sumeria, we find ourselves with little information. Mathematical and religious use of numbers before this time will forever remain a

mystery.

In closing, let me remind readers that humans are a moment in astronomic time, a transient guest of the Earth. Our minds have not sufficiently evolved to comprehend all the mysteries of God and mathematics. Our brains, which evolved to make us run from lions on the African savanna, are not constructed to penetrate the infinite mathematical veil. And only a fool would try to compress several millennia's blending of mathematics and religion. We proceed.
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<   LEONARDO 30:2 (1997) - Contents and Sample Abstracts >

Leonardo/ISAST
425 Market Street, 2nd Floor
San Francisco, CA 94105 USA
Email: isast@sfsu.edu

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These texts have accompanying material (for example, illustrations, sound files or additional texts) available in the Leonardo World Wide Web Site (http://www-mitpress.mit.edu/Leonardo/home.html).

LEONARDO 30:2 Sample Abstracts

Brent Collins: Evolving an Aesthetic of Surface Economy in Sculpture

Abstract
The author discusses the development of his sculpture, over a period of several decades, as an intuitive art of visual mathematics. He describes in detail a recent motif cycle in which locally minimal surfaces are deployed in toroids. Also discussed is the artist's collaboration with computer scientist Carlo Sequin, which has led to a virtual prototyping program developed by Sequin for this motif cycle. This computer program furthers the evolution of the artist's body of work beyond what would preciously have been possible.

Carlo H. Sequin: Virtual Prototyping of Scherk-Collins Saddle Rings

Abstract
The author discusses a computer program that he developed to visualize different configurations of saddle ring surfaces with different numbers of holes and different amounts of twist. Users can experiment with different parameter values at interactive speeds. Such virtual prototyping can save weeks of labor needed to build physical prototypes and may result in new and more optimized configurations that one would not be likely to find if all prototypes had to be built manually from physical matter. The author's program design was inspired by some of sculptor Brent Collins's recent works (described in the companion article, "Evolving an Aesthetic of Surface Economy in Sculpture"), which can be understood geometrically as rings of saddle surfaces resulting from a toroidal warping of a truncated Scherk minimal surface.

George Gessert: The Rainforests of Domestication: Ornamental Gardens as Sites of Maximum Genetic Diversity among Domesticated Plants

Abstract
The common view of plant domestication is that it is a utilitarian phenomenon accomplished long ago. However, this view is false. The overwhelming majority of domesticated species are grown only for their aesthetic qualities and entered cultivation after 1500. The author suggests that the diversity of ornamental plants is due to the diversity of our aesthetic interests and that the biophilia hypothesis may help explain the proliferation of ornamentals in recent centuries.
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        |  OPPORTUNITIES   |
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<   IBM Employment opportunity >

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Lucille Bourgeois
Computer Music Center
IBM T.J. Watson Research Center
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Email: lucille@watson.ibm.com
URL: http://www.research.ibm.com

The Computer Music Center at the IBM T.J. Watson Research Center has an immediate opening for a full-time programmer. We are working on a variety of projects including interactive music systems, sonification, and visual programming languages for distributed real-time applications.

The successful candidate must have a strong background in C++ and experience with Windows 95/NT systems programming would be extremely helpful.

We are located in Westchester Co., New York, about 1 hour north of midtown Manhattan.

Softcopy resumes (ASCII or Postscript) may be emailed to Lucille Bourgeois at the email address listed above. Hardcopy resumes may be mailed to Lucille Bourgeois at the address listed above.
We look forward to hearing from you.
****
<   IBM Looking for lunchtime concert performers >

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Danny Oppenheim
Email: music@watson.ibm.com

The Computer Music Center at the IBM Research Division, Yorktown Heights, NY is sponsoring a series of lunchtime concerts in 1997. We are interested in hosting music performances that will be of interest to a general audience and that show off interesting technology. We are located in Yorktown Heights, New York (one hour north of midtown Manhattan). If you are planning a visit to the New York area and would be interested in performing, please contact David Jameson or Danny Oppenheim. Some money is available to cover reasonable travel expenses if necessary.
****
<   Graduate Assistantship
     Virginia Center for Computer Music (VCCM) - USA >

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URL: http://www.virginia.edu/~music/VaCenterCompMusic.html

Virginia Center for Computer Music (VCCM) and McIntire Department of Music announce a possible 1997-78 Graduate Assistantship in Computer Music.

The University of Virginia is a top-ranked public research university, located in beautiful Charlottesville, VA, in the foothills of the Blue Ridge Mountains. Washington DC is about 2 hours away by car. The Department of Music offers a Master of Arts degree in Music, with concentrations in Composition, History and Criticism, and Ethnomusicology.

The Virginia Center for Computer Music, founded in 1988 by Professor Judith Shatin, is the region's most advanced facility of its kind. Current VCCM equipment includes a network of 4 NeXT machines plus a Pentium, 3 Macintosh Quadra MIDI workstations each with Digidesign digital audio, and a group of 5 PowerMac 6100 MIDI workstations. Software packages in use here include (among many others) Digital Performer, MAX, ProTools, Unisyn, Finale, HACK (developed at UVA), Cmix, rt, and CSound.

APPLICATION, ADMISSION, FINANCIAL INFORMATION:
Candidates should apply to the Master of Arts program in Music, University of Virginia Graduate School of Arts and Sciences. (Computer music teaching assistants have typically been drawn from the Masters' program in composition, though other concentrations are possible.) The M.A. can normally be completed in two academic years, i.e. four semesters. See contact information below.

Incoming students can normally expect a support package (including teaching assistantship, fellowship, and gradership) ranging from $8,500 to $9,500. Assistantship awards qualify students for Tuition Remission Fellowships which cover the cost of in-state tuition (approximately $4,800). Students who are not Virginia residents are also eligible for a limited number of Tuition Differential Fellowships which cover all remaining tuition costs (approximately $10,000).

DUTIES:
Assist Professors Shatin and Warren in teaching the three computer music courses offered in the Department of Music; the TA is involved with one course per semester. Perform routine maintenance in Macintosh-based MIDI labs. Workload is approximately 10 hours per week.
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      |   ANNOUNCEMENTS   |
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< Mathematics Across The Curriculum Project >

Claude Poux, Administrative Director
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The Math Across The Curriculum (MATC) Project at Dartmouth College, funded by the National Science Foundation, is pleased to announce two concurrent workshops for June 26-28, 1997.

Mathematics and Art together in the classroom:

This workshop grows out of two courses offered at Dartmouth. Faculty of both mathematics and art departments are welcome to attend. Pattern: a course in symmetry and design, offered by Pippa Drew and Dorothy Wallace, introduces students with minimal mathematical and artistic background to some of the concepts in group theory and design. Geometry in Art and Architecture, offered by Paul Calter, is a historical view of the long relationship between these two subjects. This workshop will be in a participative, hands on format. Participants will devote a substantial portion of the time to reworking these ideas for use at the participant's own institution.

Materials Fee: $100

Math, Philosophy and Literature:

This workshop has two components. One explores the mathematics and philosophy of infinity as it has developed over time. The other explores Renaissance science fiction, astronomy and mathematics. Participants will receive a complete reader for each of these courses, as well as exercises in other activities that the students experienced. Discussion will center on both the issues central to these topics and also the ways in which this kind of material can be used in the classroom.

Materials Fee: $100.

These workshops are 24 people each. Priority for admission to all of these workshops will be given to teams of two or more individuals from different departments in the same institution.

Costs: Room and Board: $165. Parking: $12

The Workshop will underwrite the travel expenses of the second member of each pair of participants coming from the same institution.

The MATC workshop will use a variety of teaching techniques, including group learning, hands-on activities and journal writing, and work with Internet resources. It would be useful to know about any interest or experiences you have had with any of these. Of course, we do not expect that you have had experience with all of them, or else we would not be offering the workshop! Also, please describe the availability of computer resources for students at your institution, and Internet access tools. As far as possible, we want to tailor presentation to be applicable at your home institution.

The deadline for applications is April 30, 1997, but applications will be considered until the workshops are fully subscribed. A wait list will be compiled.

Applications from individuals who are coming with another faculty member from their own institution will be given preference.

Application needing assistance to attend the workshop, please contact Claude J. Poux about possible funding.
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<   ACM MULTIMEDIA' 97
The 5th ACM International Multimedia Conference >

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November 8-14, 1997
Seattle, WA, November 10-14, 1997
Crowne Plaza Hotel
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In Cooperation With SIGBIT, SIGCHI, SIGIR and SIGOIS (tentative
lists)

ACM's annual MULTIMEDIA conference is the premier forum where
researchers and developers from academia and industry around the
world can meet to exchange ideas and report on new developments
relating to all aspects of multimedia technology and systems. The
world of computing continues to reinvent itself. Just as we
previously witnessed a dramatic transformation from textual to
visual computing, we are now in the midst of an exciting
metamorphosis to an era of multimodal computing whose ultimate shape
is as yet unknown.

The conference scope spans technology, tools and techniques for the
construction and delivery of high quality, innovative multimedia
systems and interfaces.   We are especially striving this year to
achieve balance in coverage within the technical program, between
issues relating to underlying system design and delivery - e.g.,

--hardware and architectures
--networking and communications
--compression and synchronization
--databases and information retrieval
--collaboration environments
--digital libraries

and issues relating to the human-computer interface - e.g.,

--hot application domains
--document models and authoring tools
--scalable and translucent interfaces
--interactive audio documents
--alternate modality systems
--virtual realities

We cordially invite -YOU- to take part in this exciting event by
submitting your work in one or more of the ways enumerated below,
and look forward to welcoming -YOU- to Seattle this fall for what
will be a most rewarding and exciting experience!

ALL SUBMISSIONS MUST BE RECEIVED no later than TUESDAY, JUNE 3,
1997!

See below for submission categories and addresses

TECHNICAL PAPERS of the high quality expected at major ACM
conferences are solicited. These may fall into a variety of
categories:

(a) Presentation of original and significant research.
(b) Results of relevant and rigorous empirical studies.
(c) Description of the `look and feel' and discussion of the
internal workings of an implemented system.

Papers must be set in 11-point type and formatted in two-column conference style, and may not exceed 12 pages in length including all figures, tables, and references. All authors are encouraged to send a short video with their paper if possible, to clarify and reinforce the concepts discussed - but acceptance will be based primarily on the written paper itself. Authors of accepted papers will be required to prepare an electronic version for the on-line conference proceedings, which will supplement the traditional printed volume.

All submissions -must- be received no later than Tuesday, June 3, 1997 (this is a firm deadline). Send 8 copies of full papers to the Program Chair:

James D. Hollan, Program Chair
Computer Science Department
University of New Mexico
Albuquerque, NM 87131
E-mail: hollan@cs.unm.edu
Tel. (505) 277 3112
Fax: (505) 277 6927

Authors will be notified regarding acceptance on or around July 6, and will be required to return the revised camera-ready copy, the electronic version, and a completed registration form (at least one per paper), by August 10.

PANEL PROPOSALS up to 3 pages in length on timely and controversial topics are also welcome. These submissions should be formatted like a technical paper, and if accepted will be included in the conference proceedings. They should include:

(a) An introduction by the organizer/moderator.
(b) Position statements from each panelist.
(c) Brief biographical sketches of all participants.

Send 4 copies of panel proposals to the Panels Chair:

Takayuki Dan Kimura
Computer Science Department
Washington University
St. Louis, MO 63130
E-mail: tdk@cs.wustl.edu
Tel. (314) 935 6122

TWO DAYS OF IN-DEPTH COURSES by leading experts will precede the technical program and enhance its value for both novice and seasoned professional alike. The full- and half-day offerings will span a wide variety of topics, so that there is something for everybody. Course organizers receive an honorarium which can be used, for example, to defray part of the cost of attending the conference. We invite you to take advantage of this excellent opportunity!

Proposals to organize/present a course at ACM MULTIMEDIA' 97 should be 3-4 pages long, to include the following information in the order shown:

(a) Cover page:

o Name and affiliation of the proposer/organizer.
o Course title.
o Preferred duration (full day or half day).
o Level (introductory, intermediate, or advanced).
o Names and affiliations of additional speakers, if any.

o Intended audience.
o Course abstract/overview - what will attendees learn?
o A/V aids to be used in the presentation.
(b) Detailed course description and outline (1-2 pages); if more
than one presenter, who will cover each topic/section?
(c) Biographical sketch of each speaker (one paragraph apiece), to
include: current research interests; important publications,
projects and/or awards (as appropriate); and courses previously
presented at other conferences.

Send 4 copies of course proposals to the Courses Chair:

Margaret Burnett
Computer Science Department
Oregon State University .
Corvallis, Oregon 97331 .
E-mail: burnett@cs.orst.edu
Tel. (541) 737 2539
Fax: (541) 737 3014

DAY-LONG WORKSHOPS on topics of great current interest to members of
the multimedia research community will both precede and follow the
technical program. Participation is by invitation only, under the
control of the individual organizer(s), but all workshop organizers
and attendees are expected to register for the conference as well,
to foster a symbiotic relationship among participants.

If you'd like to take advantage of this venue to conduct -YOUR-
workshop, please contact the Workshops Chair:

Stephen Itoga
319 Keller Hall / ICS
University of Hawaii
2565 The Mall
Honolulu, HI 96822
E-mail: itoga@hawaii.edu
Tel. (808) 956 3500
Fax: (808) 956 3548

STATE OF THE ART DEMOS will form an integral and important part of
the MULTIMEDIA' 97 experience. This year, we want to focus on systems
in which technical innovation is combined with artistic wizardry.
We're not 100% sure what that means, but we'll bet -YOU- know!
Amazing research prototypes and stunning commercial products are
welcome. There are just 2 constraints:

we can supply only limited equipment and certainly nothing exotic,
so if you need really special hardware you'll have to supply your
own; and space is limited, so all proposals for demos will be
referreed to assure quality.

If you'd like to propose a technically-oriented demo, please
contact:

Bikash Sabata
Telecommunications and Distributed Processing Program
SRI International
333 Ravenswood Ave.
Menlo Park, CA 94025
E-mail: sabata@erg.sri.com
Tel. (415) 859 2281

If you'd like to propose an artistically-oriented demo, please
contact:

Tim Skelly
Design Happy
26715 NE 50th Street
Redmond, WA 98053
E-mail: TimSkelly@aol.com
Tel. (206) 868 2822

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< Maid in Cyberspace - le festival XX d'art WWW >

Studio XX (Maid in Cyberspace)
4001, rue Berri, #104
Montrial (Quibec) H2L 4H2 Canada
Tel: (514) 845-7934
Email: studioxx@internauts.ca

Studio XX, Montrial's digital media center for women, presents "Maid
in Cyberspace - le festival XX d'art WWW", to be held May 31st and
June 1st, 1997 in Montreal. The festival is a weekend long forum for
the exploration and appreciation of art made for the web. There will
demonstrations of the tools used in the creation of web art,
artists' talks, a presentation of "web art: its characteristics and
its significance", and the opportunity to sit down and check out the
projects. We welcome submissions of art made for the web from all
artists.

CALL FOR SUBMISSIONS:
-must be an artistic project created for the web (or the Internet):
text, images, hypertext, sound, video, cusee me, interactive, etc.
-any one may submit a project
-the jury's decisions are final
-projects will be selected to be included in the festival and on the
Studio XX web site (in NightLight)
-honorariums will be awarded to 5 participating Canadian artists,
selected by the jury, whose projects will be spotlighted during the
festival.

Please email or send a one-page outline of the project or a URL
reference for a completed project to Studio XX.

* The purpose of the proposals is for the jury to verify the
feasibility of the projects. We wish to encourage exploration of
this medium. We will offer hosting for projects on our server,
though it is NOT obligatory to use this service. The artists whose
projects will be accepted will receive a repertory file, a user name
and a password after the examination of the dossier by the jury.
Later on we will distribute a block of HTML code to insert in all
the projects to identify the event and for the purpose of
navigation.

* DEADLINE for proposals: April 25th, 1997 (or as soon as possible
for completed projects)
* FINAL PROJECTS: by May 17th
-all projects must be ready by MAY 17th, 1997
-all projects must be in "html" (excepting those which make use of
other functions of the Internet, in which case they must be fully
functional and ready to be put into place by the same date)
-please send your project on diskette (either MAC or PC) or contact
XX for other possible arrangements.

PLEASE DO NOT HESITATE TO CONTACT FOR ANY QUESTIONS !!
Studio XX acknowledges the support of the Canada Council for the
Arts.
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< Korean Electro-Acoustic Music Society and
the Computer Music Festival in Seoul '97 >

Prof. HWANG Sung Ho
KEAMS
Department of Composition
College of Music
Seoul National University
San 56-1, Shinrim-dong, Kwanak-ku
Seoul, KOREA 151-742
E-mail: digit@plaza.snu.ac.kr

Founded in 1993, KEAMS has more than 40 young and outstanding members and most of them are professors of major Universities in Korea. Over the years, KEAMS has offered Computer Music Festival in Seoul with the support from the Korean Culture & Arts Foundation. And this Festival introduced variety of works of many composers from different parts of the world, such as America, France, Poland, Japan and Germany as well as Korea. Last year, we introduced the audio visual works which were performed in ICMC' 96, Hong Kong.

Now KEAMS is accepting works for the Computer Music Festival in Seoul '97, scheduled to take place from November 26 to 28 in Seoul Arts Center. The Festival provides a public performance of the
(1) Electro-Acoustic Music (tape alone or tape + live instrument),
(2) Live Electronic Music
(3) Music Video.

Work recorded in stereo should be submitted in CD and DAT with Score, and ADAT can be accepted when work requires the use of multi-channel to perform.

Duration: maximum 12 minutes

Works should be sent to us before July 31, and chosen works will be performed and broadcasted. The results of the selection will be announced in the 1st of September.

HWANG Sung Ho is a professor, theorist, writer and program supervisor of KBS-FM. He graduated from Seoul National University, then studied composition and music theory at Brussel Koninklijk Conservatorium and Electronic Music at Utrecht Convervatorium and Instituut voor Sonologie, Utrecht University. Now, he is a Professor at Seoul National University, President of KEAMS(Korean Electro-Acoustic Music Society) and also serves as Music Director of the new media performance series, NextWaveConcert. He received numerous commissions and performances of works by major orchestras, ensembles and dance groups in Korea, including orchestral works by KBS Orchestra and Seoul Philharmonic Orchestra, Organizing Committee for Winter Universiade '97, etc.. And his several electro-acoustic pieces were performed throughout the world such as Asian Composer's League Festival' 93(Taipei), HKUST Multimedia Concert(H.K), ICMC' 96(H.K), 96' FEM(Bladislova), Kwangju International Biennale '95. etc..
****
< They Came Here First!
a call for art work for a UFO show >

Center on Contemporary Art (Coca)
c/o They Came Here First!
65 Cedar Street
Seattle, WA 98121-1327
Tel: (206) 728-1980
Email: COCA@connect.com

Call For Flying Saucer Aficionados to include their work in a UFO
show!
What: Call for entries to They Came Here First!
When: CoCA exhibition dates June 13 - August 15, 1997
Bumbershoot exhibition dates August 25 - September 1, 1997

The Center on Contemporary Art is organizing the exhibition They
Came Here First! a show celebrating the 50th anniversary of the
first flying saucer sighting--over Mt. Rainier, Washington, on June
24, 1947. In the galleries CoCA will present contemporary --fine or
outsider--art objects, collections of UFO memorabilia, period
furniture, graphic images from movie posters, magazine and book
covers, and will host a series of performances, bands, films, and
lectures to explore the influence of UFOs on our cult ure. After its
opening at CoCA, They Came Here First! will be presented at the 1997
Bumbershoot Festival.

The flying saucer has its roots in science fiction and real science.
As a metaphor in the post-war period exploited through the mass
media, flying saucers are important icons in American life--from
appearances in xenophobic propaganda to aesthetic images on
wallpaper, in films, television, and newspapers. How has the idea,
the presence, the icon of the UFO affected you, your work, your
world? CoCA invites you to submit your art/objects d' art to They
Came Here First!

Submission Guidelines:
How: Send slides, polaroids, video tapes, digital media, any other
type of documentation about you, your work, your collection, your
treasures. If you are a fine artist, also include a resume and
related articles. Or call CoCA to find out more--(206) 728-198 0.
When: All materials must be received by May 9, 1997.
Notification for works selected by May 16, 1997.
What else: To have material returned, please send a self-addressed,
stamped envelope.
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< The 1997 International Hytime Conference >

Steven R. Newcomb, President
TechnoTeacher, Inc.
P.O. Box 23795
Rochester NY 14618)
Tel: +1 716 271 0796
Fax +1 716 271 0129
Internet: srn@techno.com
FTP: ftp.techno.com
WWW: http://www.techno.com Rochester, NY 14692-3795 USA

* Call for Papers *
(preceded by Eliot Kimber's HyTime Course)

The 1997 International Conference on the Application of HyTime will
be held at the Sheraton Hotel in Montreal, Quebec, Canada, during
August 19-20, 1997.

HyTime is one of the SGML family of ISO standards for information
representation and interchange. HyTime is the only internationally
standard way to represent hypermedia documents, and, with its object
structure modeling capabilities, which undergird the "grove"
paradigm used in SGML (including XML) and DSSSL, it is unarguably
the most general, abstract, and advanced way to use SGML, and to re-
use information of all kinds in every way.

This conference brings together HyTime users, prospective HyTime users, systems vendors, systems integrators, applications developers, consultants, and researchers to compare notes, share lore, ask questions, and develop answers. These annual GCA-sponsored conferences on HyTime are unique opportunities for everyone who wants to explore the cutting edge of practical hypermedia information interchange.

For information on attending the conference, please contact the GCA at 100 Daingerfield Road, 4th Floor, Alexandria, Virginia 22314-2228 (tel: +1 703 519 8160, fax: +1 703 548 2867, Telex: 510-600-0899). The GCA's Web site is http://www.gca.org.

Paper abstracts and presentation proposals should be submitted to Steven R. Newcomb, Conference Chair, 1997 International HyTime Conference, c/o TechnoTeacher, Inc, P.O. Box 23795, Rochester, New York 14692-3795 USA, tel. +1 716 271 0796, fax +1 716 271 0129, internet srn@techno.com.

The conference will be preceded by Eliot Kimber's one-day HyTime course on August 18. (All HyTime beginners are urged to attend this course. It will provide the understandings needed to participate fully in the conference.) Also (tentatively) planned are tutorials on Jade, DSSSL, and XML.
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< Ars Electronica Festival 97:
FleshFactor - Informationsmaschine Mensch >

M.Falkinger
Ars Electronica Center
Email: fleshfactor@aec.at
http://www.aec.at/fleshfactor

The net-discussion to this year's festival symposium has started. Please find the opening statements on the Ars Electronica homepage. Everybody is free to contribute to the forum. Please send your opening and/or ongoing remarks on the FleshFactor to: fleshfactor@aec.at.
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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

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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